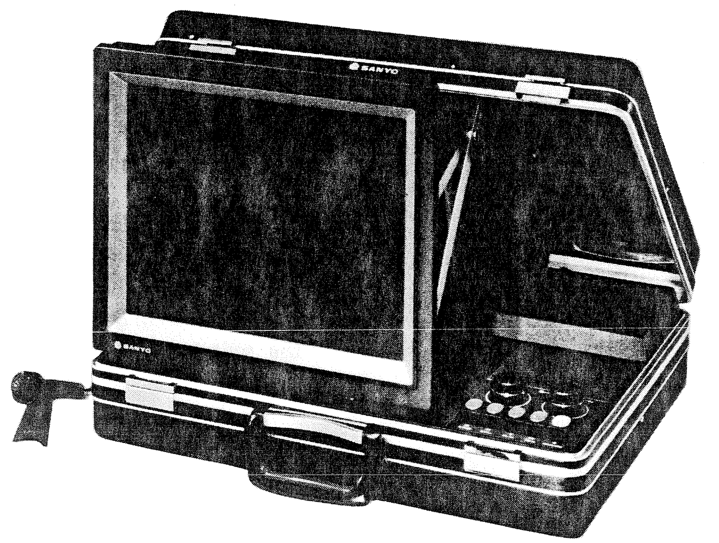
SERVICE MANUAL

SANYO

SOUND MOVIE PROJECTOR

SHV-2000

(SPITZER)



SPECIFICATIONS

Film	Super 8, Single 8, Regular 8
Reel capacity	Super 8, Regular 8: 300 ft. Single 8: 450ft.
Lens	F/1.4, f=8mm
Lamp	ANSI code, EFM: 8V, 50W
Built-in screen size	10-7/8"(W) x 8-3/8"(H) (276 x 212mm)
Projection speed	18 or 24 frames per second (switchable)
Rewind time	Rapid rewind: 300 ft. in approximately 47 sec. (in 24 frames per second setting)
Semiconductors	2 ICs 9 transistors 13 diodes
External jacks	MIC: 400 ohms AUX: 100k ohms EARPHONE/EXT. SP.: 8 ohms
Speaker	4" diameter (100mm)
Audio output power	2W max. (8 ohms)
Power source	AC: 220V, 50Hz
Power consumption	110W
Dimensions	18-15/16"(W) x 13-15/16"(H) x5-5/16"(D) (481 x 355 x 135mm)
Weight	19 lbs.,13 ozs. (9 kg)
Accessories	Mike with stand, earphone, power cord, auto-reel, cleaning brush, tilt adjustment stand with film cutter

* Specifications subject to change without notice.

WM-3269

CONTROLS & THEIR FUNCTIONS

1. STILL button

Push the STILL button (see Fig. 1), and the lever (still 1) will move in the arrow-marked direction. The lever (still 2) will also shift its position in the direction of its arrow mark.

As a result, the wire connected to the lever (still 3) will move in the direction indicated by the arrow at its right, the net assembly will turn to the position marked by the broken lines, and film will be protected from damege likely to be caused by the heat of the lamp. Meanwhile, the helical spring (still) will push the clutch (still) to the left, eagaging it with the pulley assembly (aperture). When the STILL ADJ. knob is turned clockwise, the pulley (still 1) will revolve. It will drive the pulley (still 2) via the belt (still 1). The power thus transmitted will drive the shaft (still 2), clutch (still) and pulley assembly (aperture) in that order, thereby causing the shutter assembly to turn. Next, the flexible wire (pressure plate) will pull the lever (pressure plate) as indicated by the arrow at its left. This will cause the pressure plate to close and push the aperture assembly. Thus, the claw of the claw assembly will come through the aperture assembly (see Figs. 2 & 3). The frame position will, therefore, be adjusted by the revolution of the shutter assembly (read the description above) and a whole still picture will be projected on the screen.

2. PLAY button

Push the PLAY button (see Fig. 4), and the lever (play 1) will move in the direction of its arrow mark. This will be followed by the movements of the link (play 2) and the lever (play 3) in the directions of their respective arrow marks. The link assembly (reel left) will be pulled upward by a spring. Consequently, the roller assembly (reel) will be pressed against the pulley (play reel) and the reel holder assembly. The reel holder assembly will then turn, being driven by the pulley (play reel).

Next, the lever (play 4) will be pushed as indicated by its arrow and, when the link complete(pinch) descends, the roller assembly (pinch) will press the flywheel assembly, which, receiving power from the former, will feed film at a rated speed. At the stage described above, there will be a clearance between the pad assembly and the loader assembly (large) for film-loading. The take-up tension of the film will cause the lever (pad lock) to move to the left. The lever (pad) will be pulled by its spring, causing the pad assembly and the loader assembly (large) to close.

The above will be followed by the movements of the flexible wire (pressure plate) and the lever (pressure plate), which are described in "1. STILL button".

3. REW button

Push the REW button (see Fig. 5), and the lever (play 1) will push the link (play 2), the lever (play 3) and the link assembly (reel left) in the directions of their respective arrow marks as in "2. PLAY button". The amounts of their movements are smaller than when the PLAY button is depressed, and the roller assembly will not touch the pulley (play reel) and the reel holder assembly, so the reel holder assembly will remain free.

Simultaneously with the above, the lever (rewind) will move downward and the link assembly (reel right) will be pulled downward by the spring attached to the lever (rewind). Thus, the roller assembly (reel) will be pressed against the pulley (rewind reel) and the reel holder assembly. As a result, the reel holder assembly will turn, being driven by the pulley (rewind reel) which takes power from the gear (rewind).

4. RECORD button

Push the RECORD button (see Fig. 6), and the flexible wire (record) will be pulled to the right and switch on the recording circuit by pulling the slide lever of the switch unit (slide) on the printed circuit board.

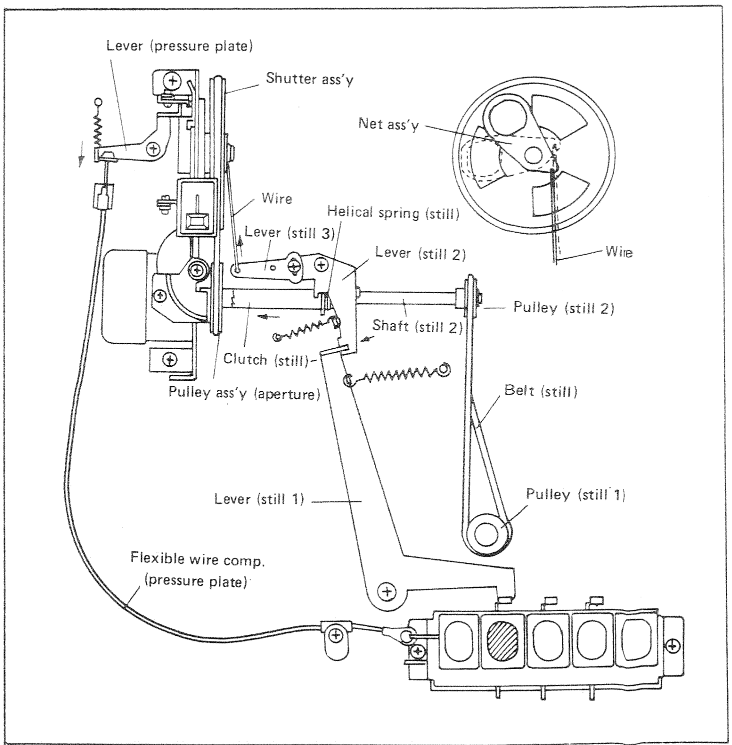


Fig. 1

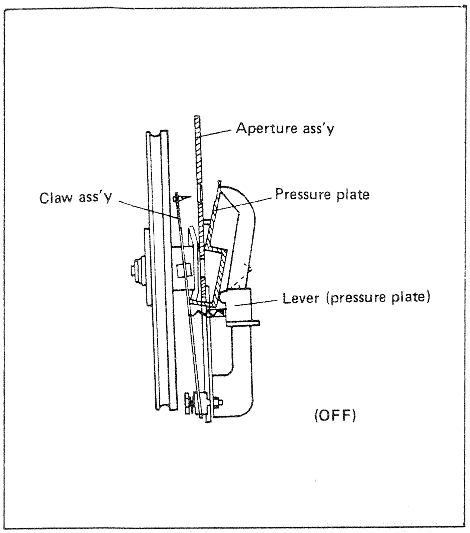

Aperture ass'y
Claw ass'y
Pressure plate
Lever (pressure plate)
(OFF)

Fig. 2

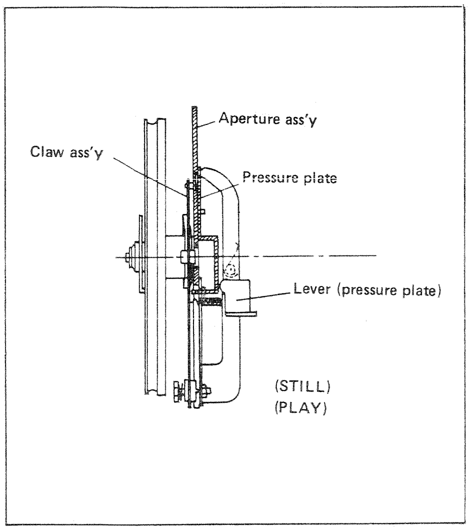

Aperture ass'y
Claw ass'y
Pressure plate
Lever (pressure plate)
(STILL)
(PLAY)

Fig. 3

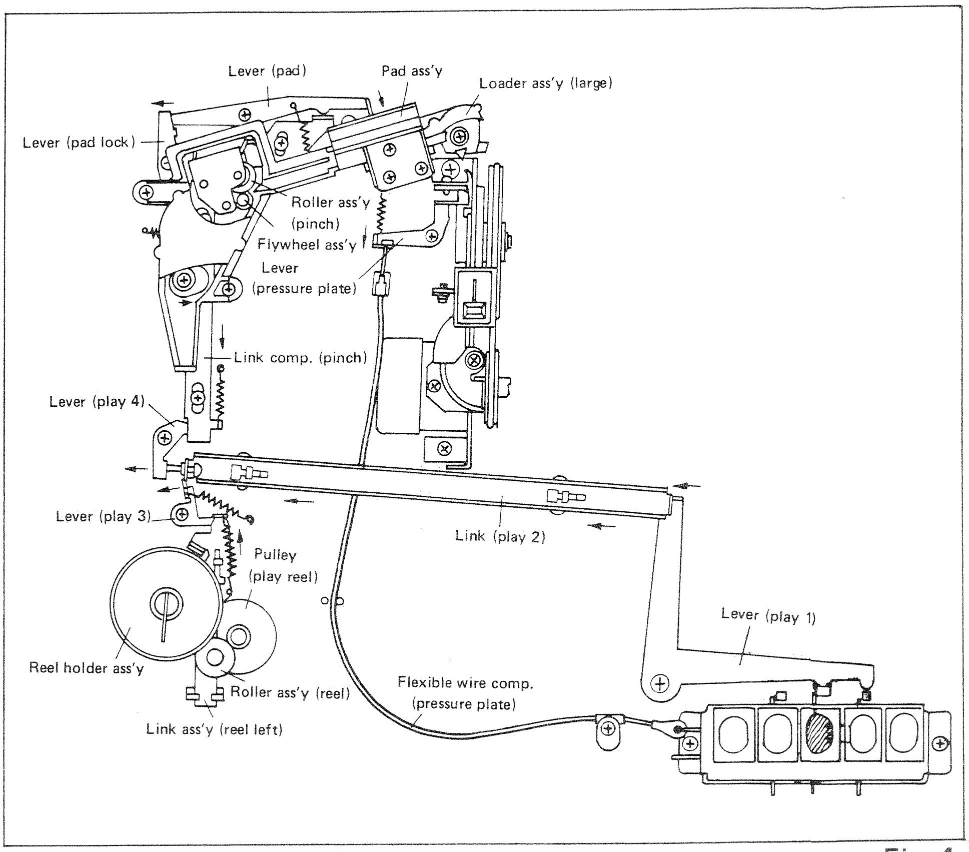

Lever (pad)
Pad ass'y
Loader ass'y (large)
Lever (pad lock)
Roller ass'y
(pinch)
Flywheel ass'y
Lever
(pressure plate)
Link comp. (pinch)
Lever (play 4)
Lever (play 3)
Link (play 2)
Pulley
(play reel)
Lever (play 1)
Reel holder ass'y
Roller ass'y (reel)
Flexible wire comp.
(pressure plate)
Link ass'y (reel left)

Fig. 4

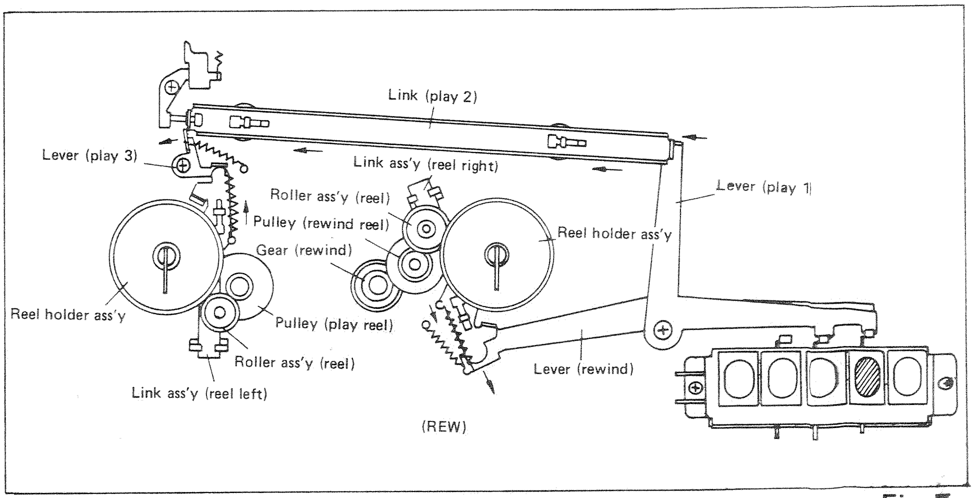

Link (play 2)
Lever (play 3)
Link ass'y (reel right)
Lever (play 1)
Roller ass'y (reel)
Pulley (rewind reel)
Reel holder ass'y
Gear (rewind)
Reel holder ass'y
Pulley (play reel)
Roller ass'y (reel)
Lever (rewind)
Link ass'y (reel left)
(REW)

Fig. 5

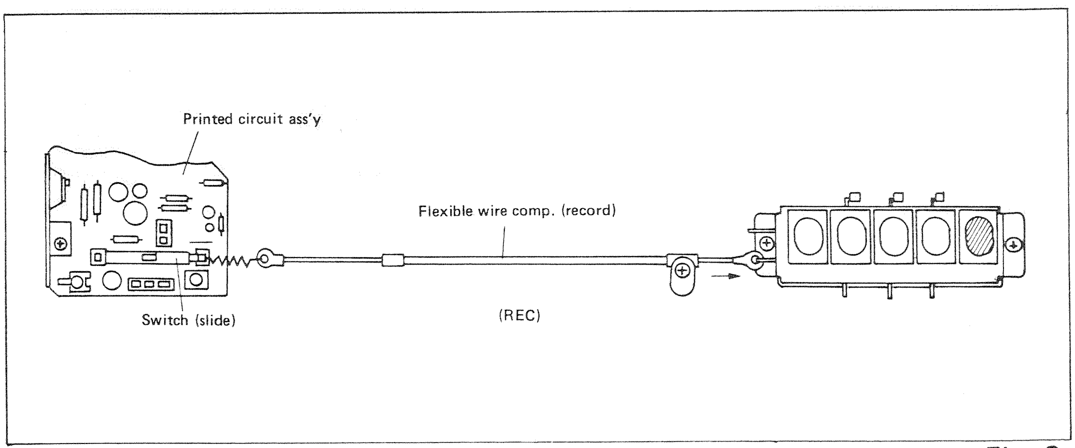
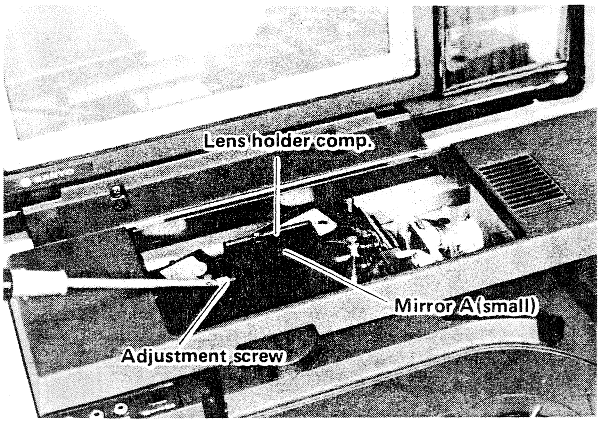

Printed circuit ass'y
Flexible wire comp. (record)
Switch (slide)
(REC)

Fig. 6

ADJUSTMENTS

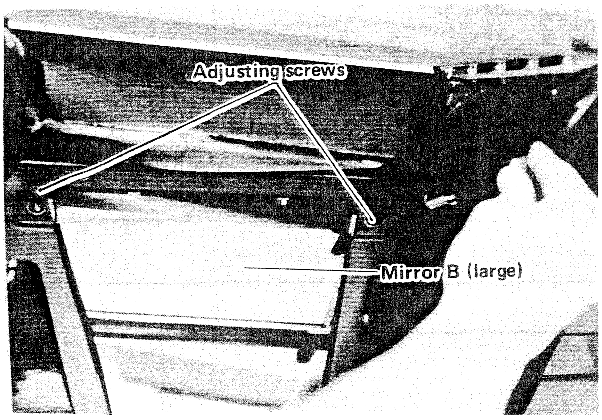
ADJUSTMENT OF OPTICAL AXIS

Project a test pattern or a picture on the screen. Adjust the mirror A (small) by turning its adjusting screw until the picture frame is laterally positioned at the center of the screen. (Photo 1)
(Turn the screw clockwise, and the picture frame will move to the right. Turn the screw counterclockwise, and the picture frame will move to the left.)
Be sure to secure the screw by applying lock-paint after each adjustment.


Lens holder comp.
Mirror A (small)
Adjustment screw

(Photo 1)

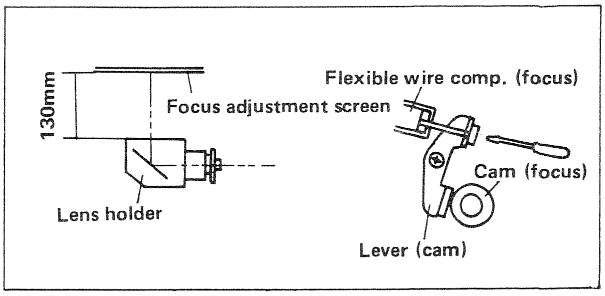
Adjust the mirror B (large) when positioning the picture frame vertically at the center of the screen. (Photo 2)
(Loosen the adjusting screws, and the optical axis will move upward. To lower it, tighten the screws.)
Be sure to secure the screws by applying lock-paint after each adjustment.

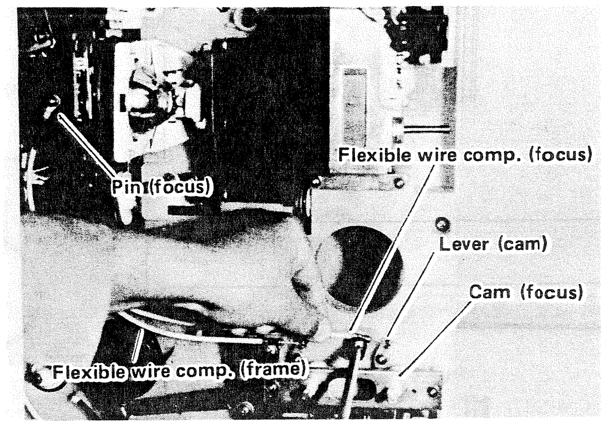

Adjusting screws
Mirror B (large)

(Photo 2)

ADJUSTMENT OF FOCUSING

Set the movie projector in the STILL mode and screen a test pattern or a picture. Turn the cam (focus) to the position where the distance between the cam shaft center and the lever (cam) is the smallest. Set the adjustment screen 130mm away from the glass surface of the lens holder and focus the picture on the screen by adjusting the flexible wire (focus). (Photo 3)


130mm
Flexible wire comp. (focus)
Focus adjustment screen
Cam (focus)
Lens holder
Lever (cam)


Flexible wire comp. (focus)
Pin (focus)
Lever (cam)
Cam (focus)
Flexible wire comp. (frame)

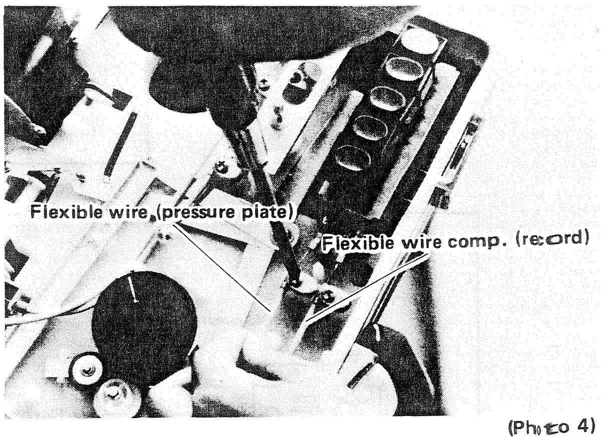
(Photo 3)

ADJUSTMENT OF FRAMING

Load the projector with movie film and set it in the PLAY mode. Adjust the flexible wire in such a way that the picture frame on the lens holder glass surface moves uniformly up and down when the FRAME ring is turned. (Photo 3)

ADJUSTMENT OF FILM GATE

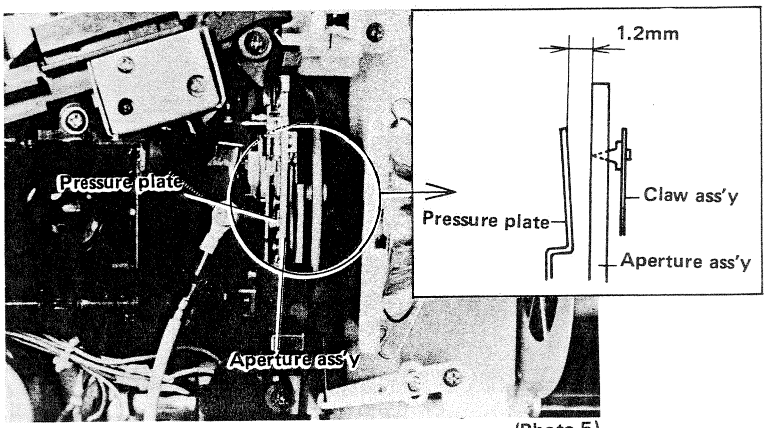
Switch off the movie projector before adjusting the film gate. Adjust the flexible wire (pressure plate) to obtain a clearance of approximately 1.2mm between the pressure plate and the aperture assembly. (Photo 4)


Flexible wire (pressure plate)
Flexible wire comp. (record)

(Photo 4)

* Be sure that the claw (viz. pin) of the claw assembly does not come through the aperture assembly when the projector is switched off. (Photo 5)

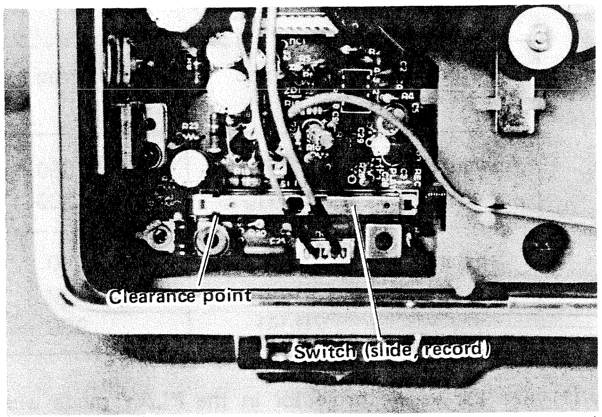
* Next, press the PLAY button and be sure that there is no clearance between the pressure plate and the aperture assembly.


1.2mm
Pressure plate
Claw ass'y
Pressure plate
Aperture ass'y
Aperture ass'y

(Photo 5)

ADJUSTMENT OF RECORD SWITCH (slide)

When the movie projector is switched off or in the RECORD mode, there should be no clearance at the point (indicated in photo 6) of the switch (slide) on the printed circuit board. Adjust the flexible wire (record) if necessary. (Photo 6)

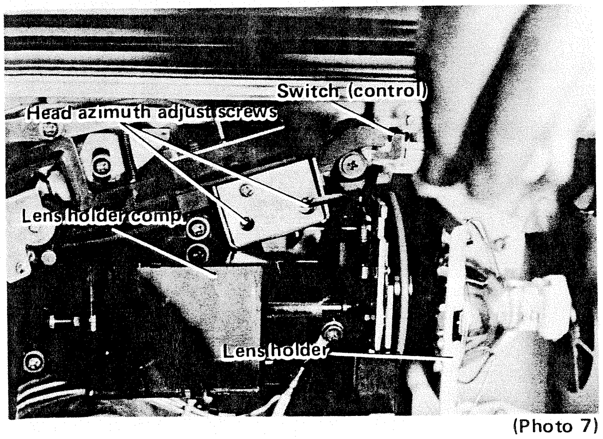

Clearance point
Switch (slide, record)

(Photo 6)

ADJUSTMENT OF HEAD AZIMUTH

Load test or movie film on the movie projector. With the projector in the PLAY mode, adjust the azimuth of the head by turning its two screws until the sound is loudest.

Secure the screws with lock-paint after adjustment. (Photo 7)

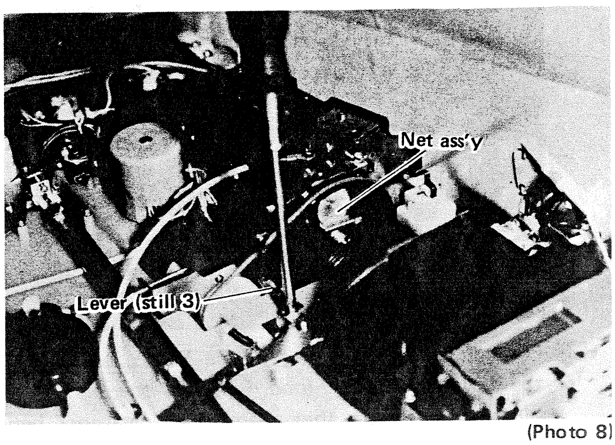

Switch (control)
Head azimuth adjust screws
Lens holder comp.
Lens holder

(Photo 7)

* The head supplied by SANYO for surviving purposes has its azimuth adjusted prior to shipment. No further adjustment is necessary.

ADJUSTMENT OF STILL LEVER

Depress the STILL button and adjust the lever (still 3) until the net assembly comes directly above the center of the aperture assembly. (Photo 8)


Net ass'y
Lever (still 3)

(Photo 8)

ADJUSTMENT OF LAMP HOLDER

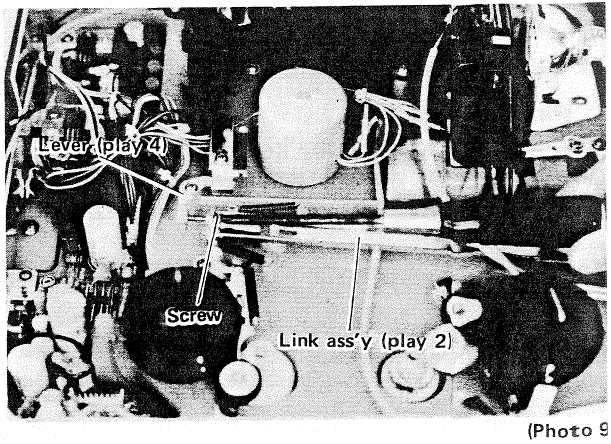
Switch on power. Look down at the lens holder and adjust the position of the projector lamp by turning its set screws. When properly adjusted, the "stand-by" light of the lamp should be the brightest. (Photo 7)

ADJUSTMENT OF FILM SPEED CONTROL SWITCH

Load movie film on the projector and set it in the PLAY mode. Adjust the film speed control switch by turning its set screw, so it will function properly at either of the two speed settings (18/24). (Photo 7)

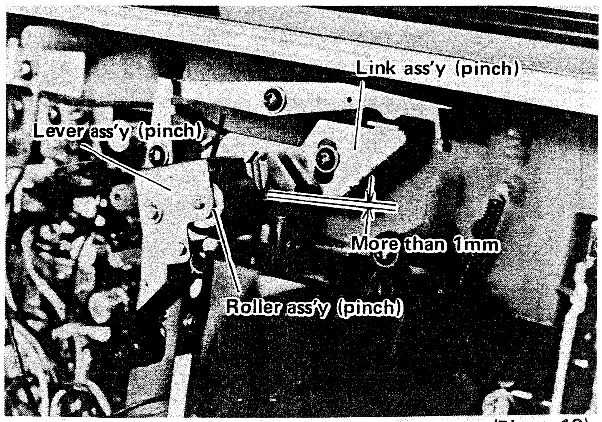
ADJUSTMENT OF LINKAGE

(1) Depress the REW button. Turn the screw at the left end of the link (play 2) and make it contact the lever (play 4). Lock it with its nut and secure them, after adjustment, by applying lock-paint. (Photo 9)


Lever (play 4)
Screw
Link ass'y (play 2)

(Photo 9

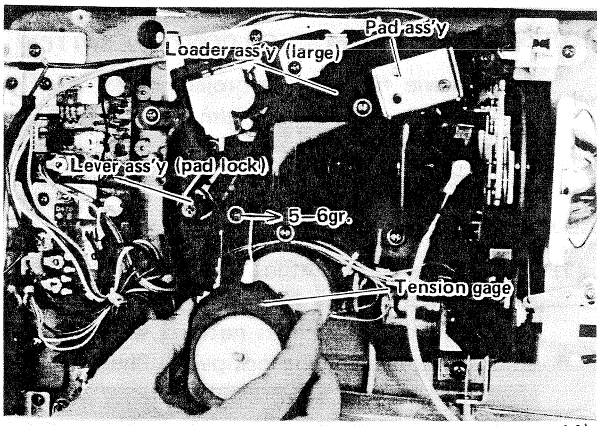
(2) Press the PLAY button. Confirm that there is a gap of at least 1mm between the lever assembly (pinch) and the link assembly (pinch). (Photo 10)
In this state, the roller assembly (pinch) should have a pressure of 600 to 700 grams.



(Photo 10)

(3) Set the movie projector in the PLAY mode and pull the lever assembly (pad lock) in the arrow-marked direction. Be sure that there is no clearance between the pad assembly and the loader assembly (large). (Photo 11)

(4) Push the OFF button and see if the lever assembly (pad lock) returns. The lever assembly should have a tension of 5–6 grams with the OFF button depressed. (Photo 11)



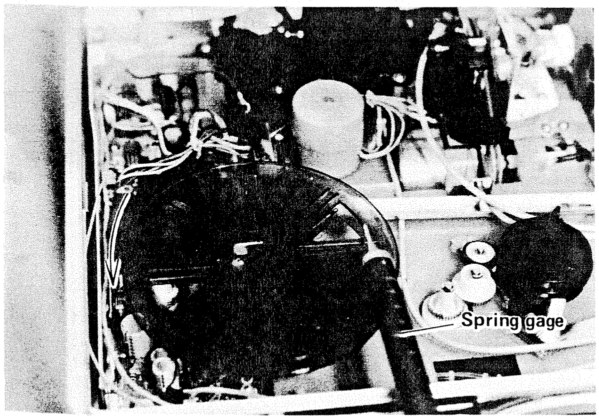
(Photo 11)

ADJUSTMENT OF TORQUES

*** Winding torque**

(1) Set the movie projector in the PLAY mode.

(2) Measure the winding torque with a spring gauge. The torque should be within a range of 160–200 g-cm. (Photo 12)

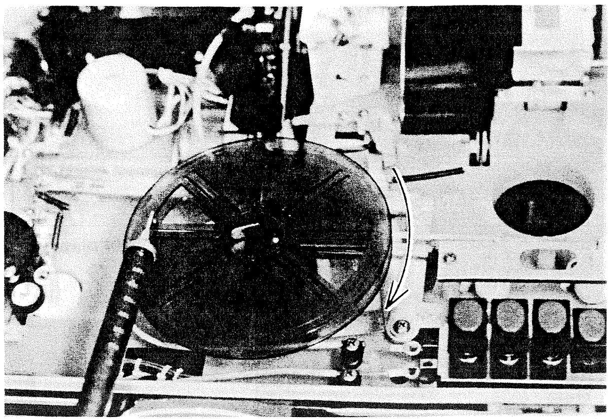


(Photo 12)

*** Rewinding torque**

(1) Set the movie projector in the REWIND mode.

(2) Measure the rewinding torque with a spring gauge. The torque should be within a range of 800–1300 g-cm. (Photo 13)



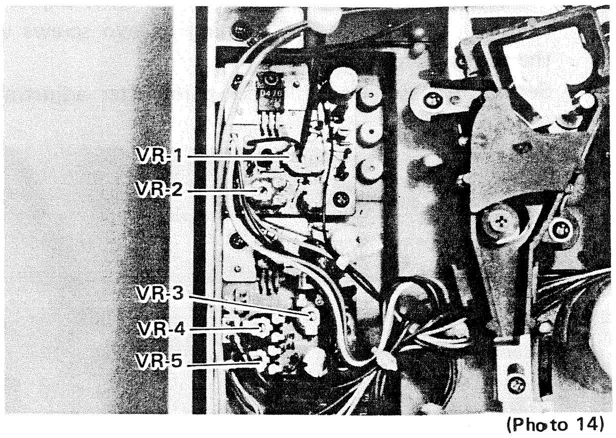
(Photo 13)

* Should the specific torque values not fall within the rated ranges, clean the reel holder assembly (lower), roller assembly (reel), pulley (play reel), gear (rewind) and belt (reel) with alcohol.

ADJUSTMENT OF MOTOR SPEEDS

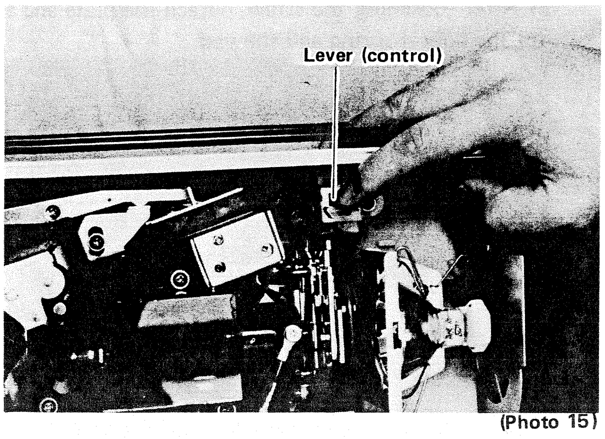
Motor	Parts to be adjusted	Rated speed (rpm)
Aperture motor	VR-(2) VR-(1)	3,650 1,800
Capstan motor	VR-(5) VR-(3) VR-(4)	660 730 980

(1) Set the movie projector in the PLAY mode with no film loaded and adjust the speed of the motor (aperture) to the rated value by turning VR-(2). (Photo 14)



(Photo 14)

(2) Lift the end of the lever (control) and adjust the speed of the motor (aperture) to the rated value by turning VR-(1). (Photos 14 & 15)

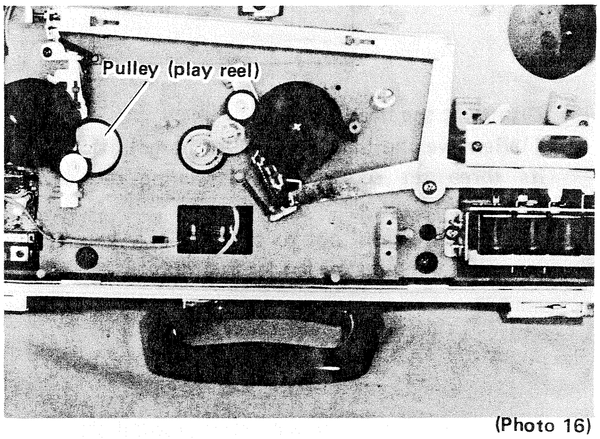


(Photo 15)

(3) Slide the aperture setting lever (aperture) to R and set the movie projector in the PLAY mode. Adjust the speed of the pulley (play reel) to the rated value by turning VR-(5). (Photos 14 & 16)

(4) Slide the aperture setting lever (aperture) to S and the speed selector lever (slide) to 18. After setting the movie projector in the PLAY mode, adjust the speed of the pulley (play reel) to the rated value by turning VR-(3). (Photos 14 & 16)

(5) After going through the above steps, slide the speed selector lever (slide) to 24 and adjust the speed of the pulley (play reel) to the rated value by turning VR-(4). (Photos 14 & 16)



(Photo 16)

INSTRUCTIONS FOR DISASSEMBLY

CHASSIS

(1) Detach the main cover from the chassis.

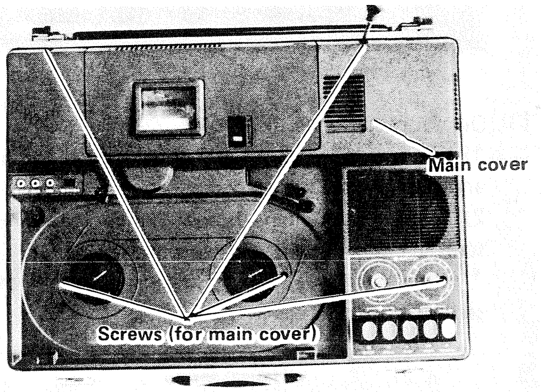
The main cover is held by five screws. Remove these screws, open the main cover, and unplug the connectors. Then, the main cover can be separated from the chassis. (Photos 1 & 2)

NOTES:

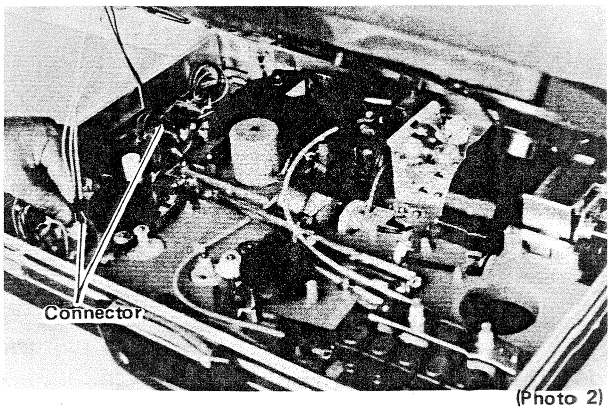
* Pull off the STILL ADJ./FRAME and VOLUME/FOCUS knob assemblies. Be very careful not to damage them.

* Be sure to unplug the connectors before detaching the main cover.

* Put the lead wires properly on the circuit board when re-attaching the main cover.

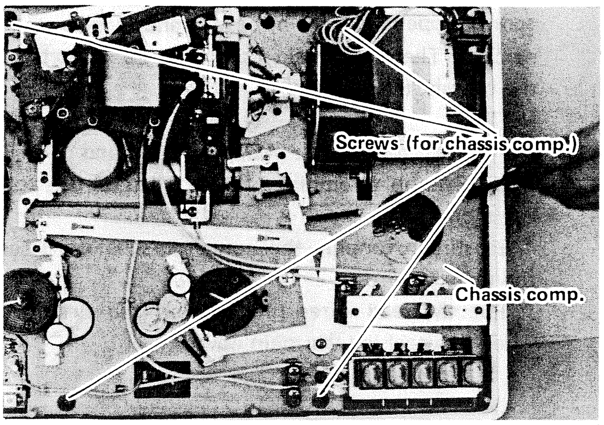


(Photo 1)



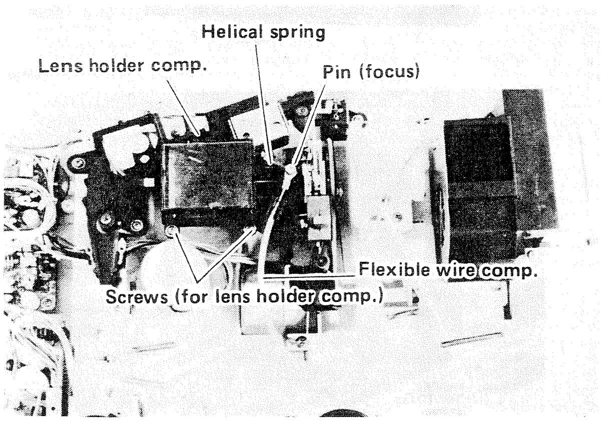
(Photo 2)

(2) Take the chassis out of the case.
The chassis is held with six screws. Remove the screws and lift the chassis out of the case. (viz. cabinet assembly). (Photo 3)


Screws (for chassis comp.)
Chassis comp.

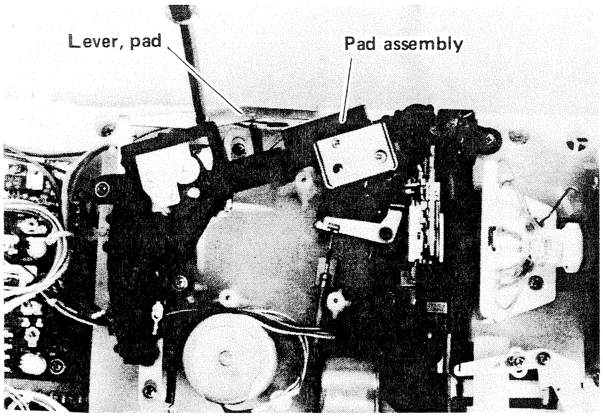
(Photo 3)

(3) Dismount the lens. (Photo 4)
1) Remove the pin (focus) and, then, the helical spring and the flexible wire.
2) Take out the lens holder which is held with three screws, and then, the projector lens.
* After each reassembly, check to see that the lens slides smoothly.


Helical spring
Lens holder comp.
Pin (focus)
Flexible wire comp.
Screws (for lens holder comp.)

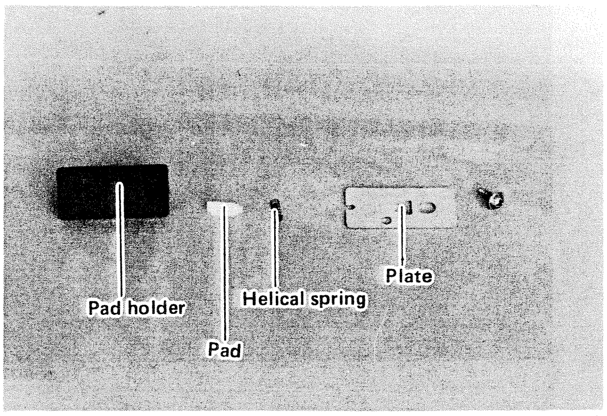
(Photo 4)

(4) Disconnect the lever (pad).
The lever is screwed to the helical spring. (Photo 5)


Lever, pad
Pad assembly

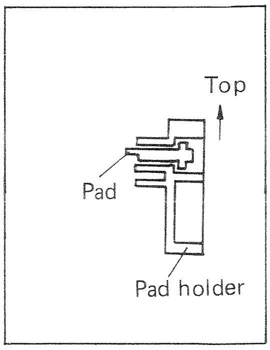
(Photo 5)

(5) Disassemble the pad assembly. (Photo 6)
1) Disconnect the pad assembly from the lever (pad). (Photo 5)
2) After loosening the screw, detach the plate and take out the helical spring and the pad.

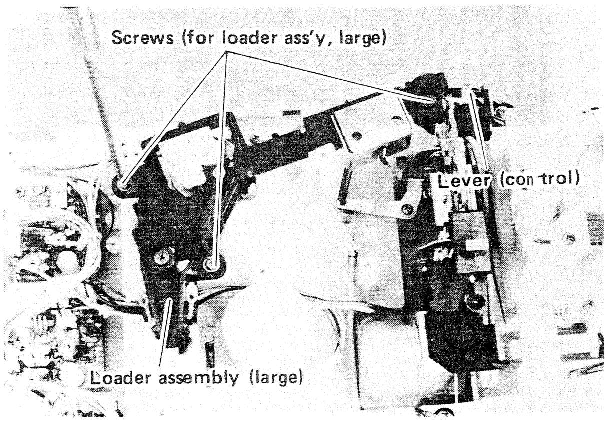

Pad holder
Helical spring
Plate
Pad

(Photo 6)

* When reassembling the pad assembly, set the pad as illustrated below. The pad should be pressed with a force of approximately 40 grams.

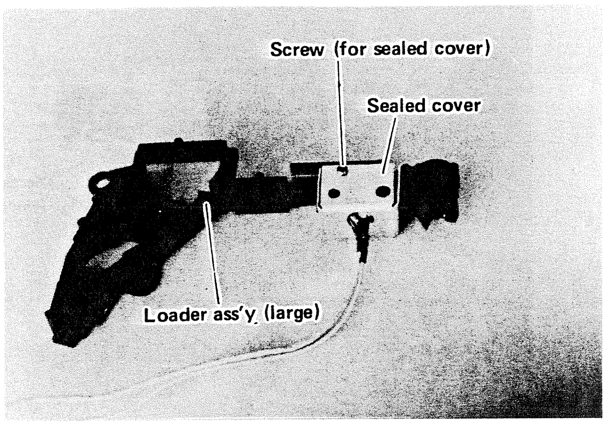

Top
Pad
Pad holder

(6) Dismount the head.
1) Remove the loader assembly (large) after loosening its three set screws and detaching the connector. (Photo 7)
NOTE: Be careful not to pull the lever (control) when removing the loader assembly.


Screws (for loader ass'y, large)
Lever (control)
Loader assembly (large)

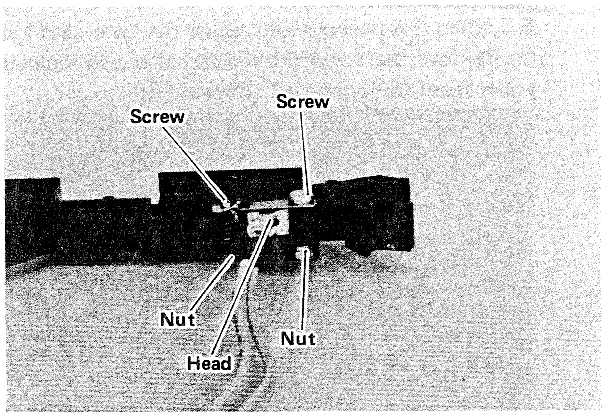
(Photo 7)

2) Detach the sealed cover from the loader assembly (large) after removing the screws holding the sealed cover at its place. (Photo 8)


Screw (for sealed cover)
Sealed cover
Loader ass'y (large)

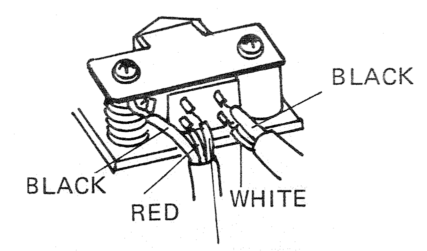
(Photo 8)

3) Loosen the nuts on the head adjusting screws and remove the head. (Photo 9)


Screw
Screw
Nut
Head
Nut

(Photo 9)

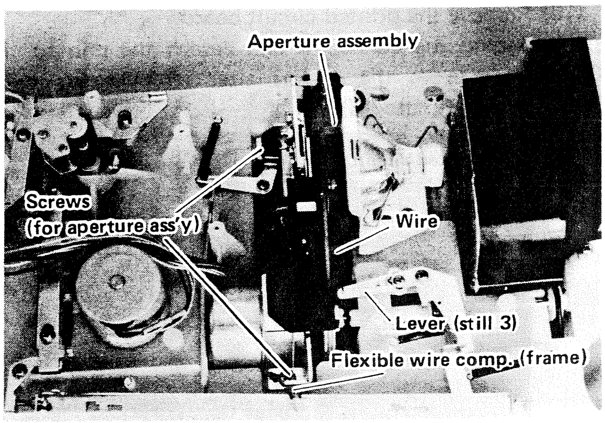
* Refer to "ADJUSTMENT OF HEAD AZIMUTH" on Page 4 for instructions when the head has to be adjusted.
(Be careful not to break the lead wires.)


BLACK
BLACK
RED
WHITE
WHITE

(Connection diagram)

(7) Disconnect the lever (still 3).
Remove the lever set screw and pull the wire (still) out of the aperture assembly. (Photo 10)

(8) Dismount the aperture assembly.
Remove the two screws setting the aperture assembly, and it will come off the chassis. (Photo 10)

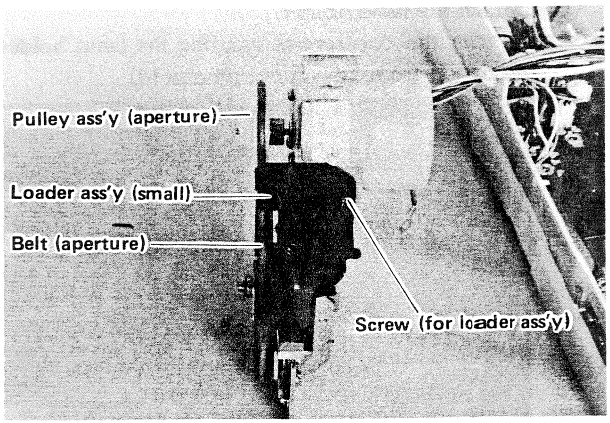

Aperture assembly
Screws
(for aperture ass'y)
Wire
Lever (still 3)
Flexible wire comp. (frame)

(Photo 10)

(9) Detach the loader assembly (small).
The loader assembly will come off the aperture assembly when the screw holding them together is removed. (Photo 11)

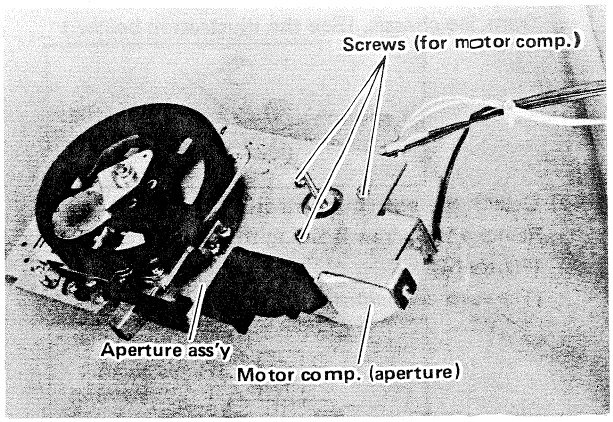
(10) Detach the belt (aperture) from the pulley assembly (aperture).

(11) Detach the pulley assembly (aperture).
The pulley assembly is fit to the motor with a set screw. (Photo 11)
* After reassembly, secure the screw by applying lock paint to it.


Pulley ass'y (aperture)
Loader ass'y (small)
Belt (aperture)
Screw (for loader ass'y)

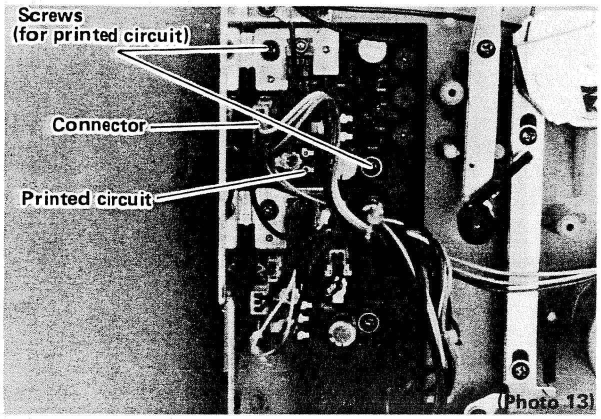
(Photo 11)

(12) Dismount the motor unit (aperture).
The motor unit is held to the aperture assembly with three screws. (Photo 12)


Screws (for motor comp.)
Aperture ass'y
Motor comp. (aperture)

(Photo 12)

(13) Remove the printed circuit board.
Unplug the connector and detach the printed circuit board from the chassis after removing its two set screws. (Photo 13)

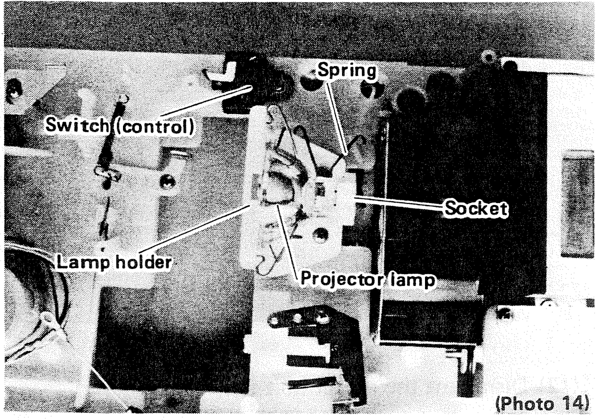

Screws (for printed circuit)
Connector
Printed circuit
(Photo 13)

(14) Disconnect the flexible wire (frame).
Disconnect the flexible wire end from the aperture-setting lever and separate the outer cap from the aperture. (Photo 10)

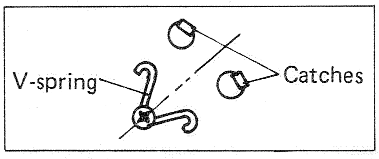
(15) Remove the projector lamp.
Remove the socket from the lamp and the lamp from the lamp holder. (Photo 14)

NOTE: The lamp becomes very hot during film projection. Wait until it becomes cool.

(16) Detach the lamp holder.
Remove the two screws sucuring the lamp holder and separate it from the spring. (Photo 14)


Spring
Switch (control)
Socket
Lamp holder
Projector lamp
(Photo 14)

Set the top of the spring on the center line running down the center of the two spring catches protruding from the chassis. (See the illustration below.)


V-spring
Catches

(17) Detach the switch (control).
Remove the screw holding the switch (control). (Photo 14)
(The wire connections are illustrated below.)

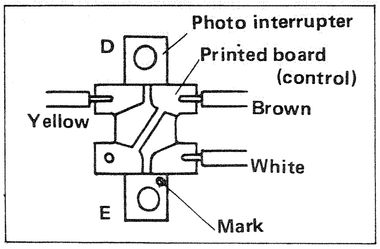
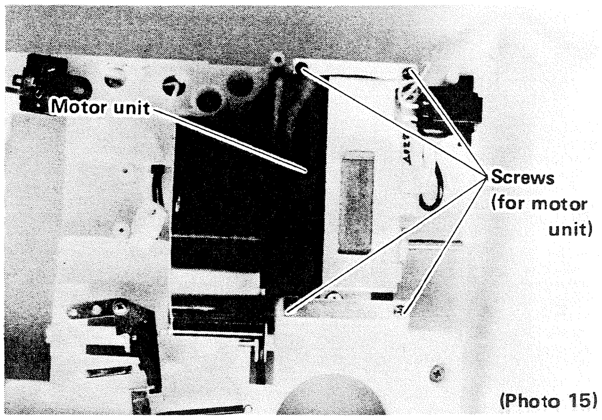
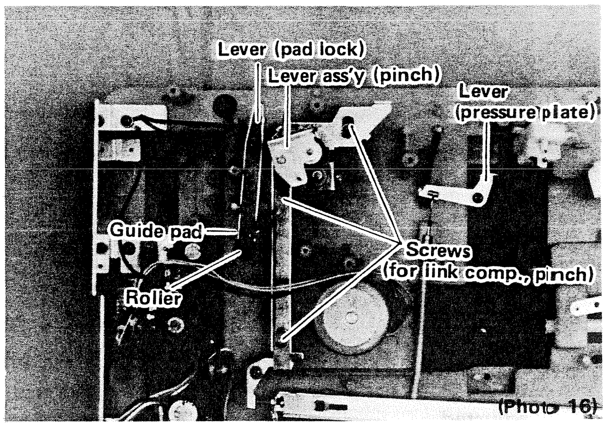


Photo interrupter
D
Printed board (control)
Yellow
Brown
White
E
Mark

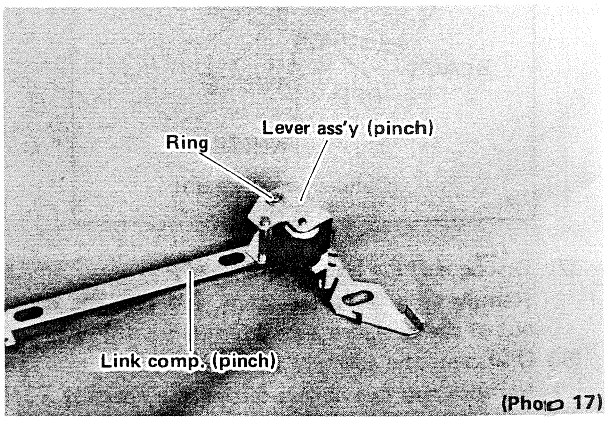
(18) Dismount the motor unit.
1) The motor unit is held to the chassis with four screws. (Photo 15)


Motor unit
Screws (for motor unit)
(Photo 15)

(19) Detach the lever (pad lock).
1) Remove the set screw and the helical spring in that order, and the lever (pad lock) will come off.
* Refer to "ADJUSTMENT OF LINKAGE" on Pages 4 & 5 when it is necessary to adjust the lever (pad lock).
2) Remove the screw setting the roller and separate the roller from the guide pad. (Photo 16)


Lever (pad lock)
Lever ass'y (pinch)
Lever (pressure plate)
Guide pad
Screws (for link comp., pinch)
Roller
(Photo 16)

(20) Detach the link complete (pinch). (Photo 16)
1) Remove the three set screws and the spring. Then, detach the link complete (pinch).
2) Remove the ring holding the lever assembly (pinch). Pull off the lever assembly (pinch) and remove the spring. (Photo 17)


Ring
Lever ass'y (pinch)
Link comp. (pinch)
(Photo 17)

* Instructions for adjusting the lever assembly (pinch) are given in "ADJUSTMENT OF LINKAGE" on Pages 4 & 5.

(21) Detach the lever (pressure plate).

Detach the lever (pressure plate) from the chassis after removing the lever set screw, the helical spring H and the flexible wire. (Photo 16)

* Adjust the lever (pressure plate) after reassembly, in accordance with instructions in "ADJUSTMENT OF FILM GATE" on Pages 3 & 4.

(22) Detach the levers (paly 1 & 4) and the link (play 2). (Photo 18)

1) Detach the lever(play 1) after removing its set screw.

2) Slide the link (play 2) to the right and separate it from the catch protruding from the chassis.

3) Detach the lever(play 4) after removing its set screw.

* Refer to instructions in "ADJUSTMENT OF LINKAGE" on Pages 4 & 5 during reassembly.

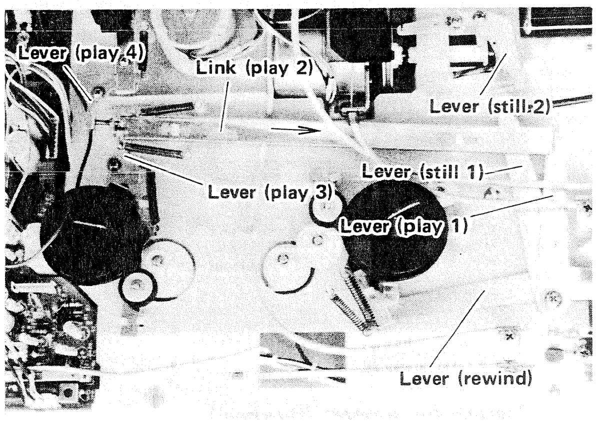
(23) Detach the levers (still 1 & 2).

1) First, detach the lever (still 1). (Photo 18)

2) Detach the lever (still 2) after removing its set screw. (Photo 18)

(24) Remove the helical springs B and C, and detach the lever (rewind). (Photo 18)

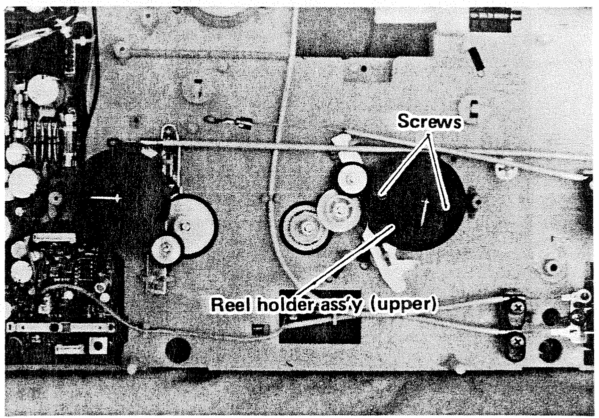
(25) Detach the lever (play 3) after removing its set screw and helical spring. (Photo 18)


Lever (play 4)
Link (play 2)
Lever (still 2)
Lever (still 1)
Lever (play 3)
Lever (play 1)
Lever (rewind)

(Photo 18)

(26) Dismount the reel holder assembly (upper).

The reel holder assembly (upper) is fixed with two set screws. (Photo 19)


Screws
Reel holder ass'y (upper)

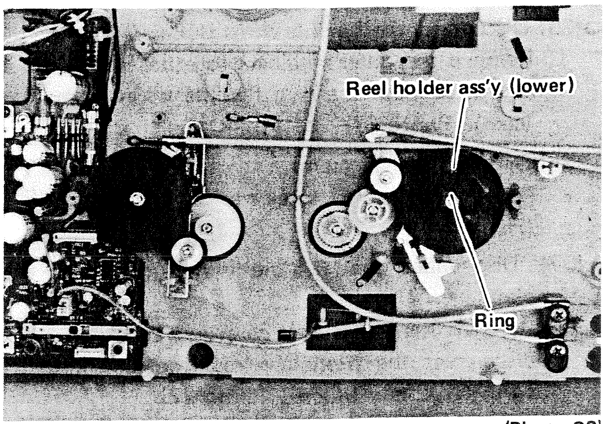
(Photo 19)

(27) Dismount the reel holder assembly (lower).

First, remove the set ring and pull the reel holder assembly (lower) off the pin (chassis). (Photo 20)

* Upon reassembly, check the reel holder assembly (lower) for a thrust.

* Relevant instructions are given in "ADJUSTMENT OF TORQUES" on Page 5.


Reel holder ass'y (lower)
Ring

(Photo 20)

(28) Detach the roller assembly (reel)

Remove the set ring and pull the roller assembly (reel) off the link assembly (reel). (Photo 21)

* Upon reassembly, check the roller assembly for a thrust.

(29) Detach the link assemblies (reel).

Slide the link assembly (reel, left) upward and the link assembly (reel, right) downward, and they will be freed from their respective catches protruding from the chassis. (Photo 21)

(30) Dismount the pulley (play reel).

Remove the set ring and lift the pulley (play reel) off the pin (chassis). (Photo 21)

* Upon reassembly, check the pulley (play reel) for a thrust.

(31) Dismount the pulley (rewind reel).

First, remove the reel holder assemblies (upon & lower) and the roller assembly as instructed in (26), (27) and (28). Next, pull the pulley (rewind reel) off the pin (gear) after removing its set ring. (Photo 21)

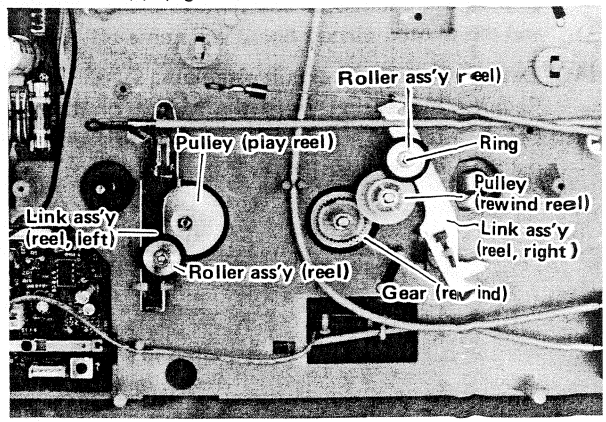
(32) Detach the link assembly (reel).

Slide the link assembly (reel) downward, and it will come off the catch protruding from the chassis. (Photo 21)

(33) Detach the gear (rewind).

Pull the gear (rewind) off the pin (chassis) after removing its set ring. (Photo 20)

* Upon reassembly, check the gear (rewind) for a thrust and apply grease to the teeth.


Roller ass'y (reel)
Pulley (play reel)
Ring
Pulley (rewind reel)
Link ass'y (reel, right)
Link ass'y (reel, left)
Roller ass'y (reel)
Gear (rewind)

(Photo 21

(34) Detach the cam holder.

The cam holder is secured with two set screws. After removing the cam holder, pull a pair of washers and cams (focus) off the shaft (still 1). (Photo 22)

* When reassembling the cams (focus), turn and adjust them with the washers to prevent them from moving backward.

(35) Disconnect the flexible wires (focus & frame).

Remove the outer retainers together with their screws and disconnect the two flexible wires from the lever (cam). (Photo 22)

(36) Detach the lever (cam).

Remove the two set screws to detach the lever (cam). (Photo 22)

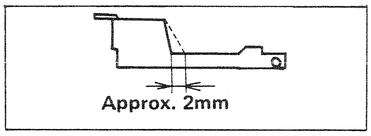
(37) Disconnect the flexible wires (record & pressure plate).

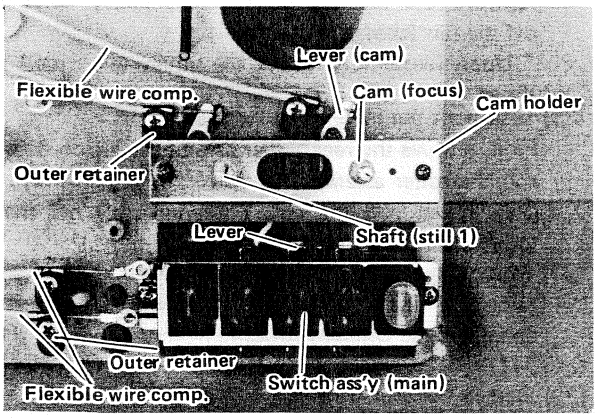
Remove the outer retainers and their screws. Then, disconnect the flexible wires from the levers of the switch assembly (main). (Photo 22)

(38) Detach the switch assembly (main).

The main switch assembly is fixed with two screws. (Photo 22)

* The levers can be detached very easily. Note that of the three levers the one at the center is shorter than the others as shown below. Do not locate them at wrong places when reassembling them.




Lever (cam)
Flexible wire comp.
Cam (focus)
Cam holder
Outer retainer
Lever
Shaft (still 1)
Outer retainer
Flexible wire comp.
Switch ass'y (main)

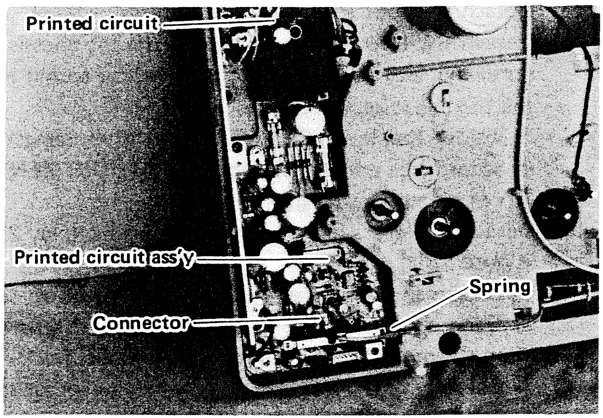
(Photo 22)

(39) Detach the printed circuit board (small).

Unplug the connector and remove the two set screws, and the printed circuit board will come off. (Photo 23)

(40) Detach the printed circuit assembly.

Remove the spring from the switch on the printed circuit assembly, unplug the connector and remove the three set screws. (Photo 23)

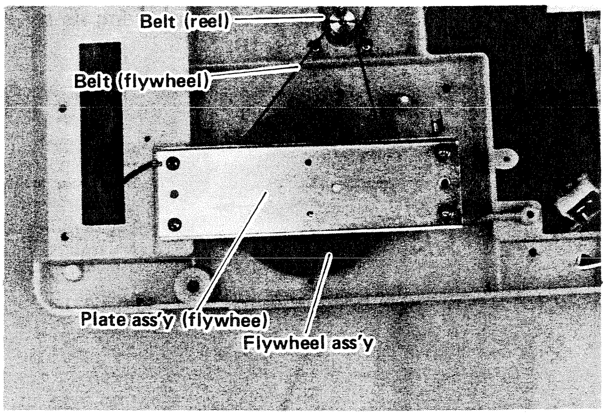

Printed circuit
Printed circuit ass'y
Spring
Connector

(Photo 23)

(41) Dismount the flywheel assembly.

Remove the four screws holding the plate assembly from the bottom of the chassis. Detach the plate and the two belts.

Then, the flywheel assembly will come off the chassis. (Photo 24)


Belt (reel)
Belt (flywheel)
Plate ass'y (flywhee)
Flywheel ass'y

(Photo 24)

(42) Detach the support (flywheel).

The support (flywheel) is attached to the plate (flywheel) with two screws. (Photo 25)

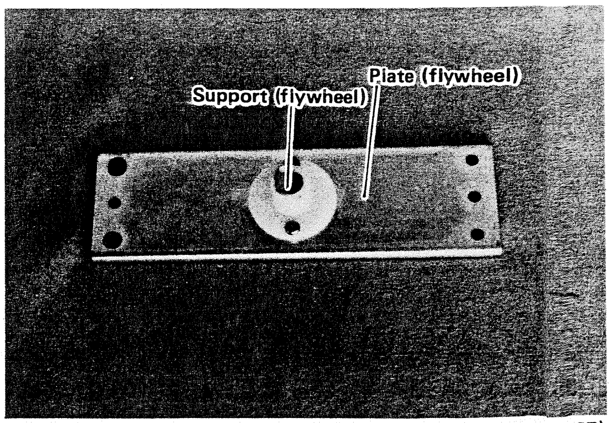


Plate (flywheel)
Support (flywheel)

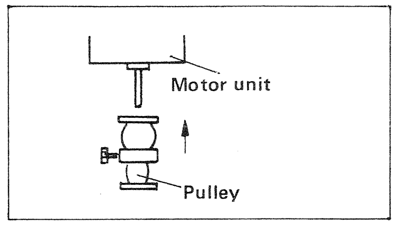
(Phoo 25)

(43) Dismount the motor unit. (Photo 26)

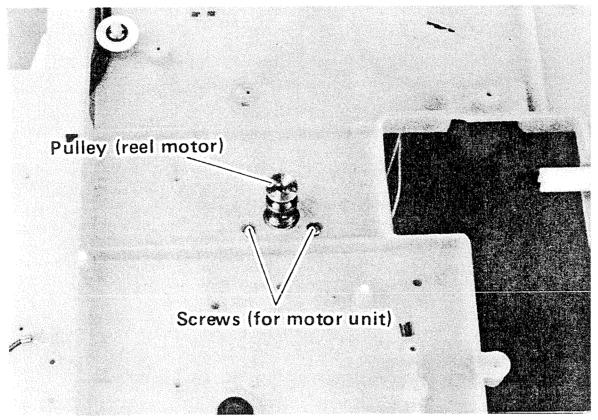
1) Detach the pulley (reel motor).

* Apply lock paint to threads when reassembling the pulley.

* Put the pulley on the motor shaft with the larger-diameter section on the motor side.


Motor unit
Pulley

2) The motor unit can be dismounted from the chassis when its three set screws have been removed.


Pulley (reel motor)
Screws (for motor unit)

(PHoto 26)

(44) Detach the volume.

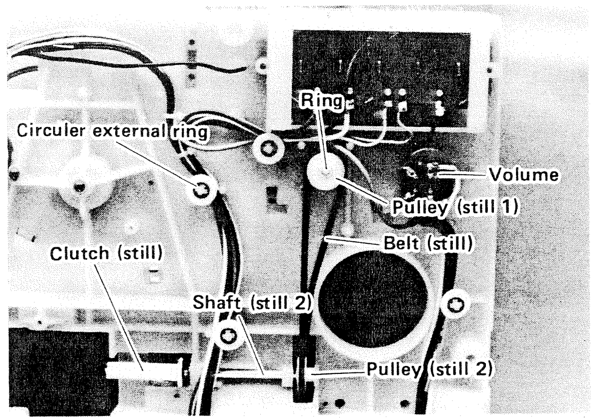
The volume can be removed to the rear of the chassis after taking off the nut on the upper side. (Photo 27)

(45) Detach the pulley (still 1).

The pulley will come off the shaft (still 1) when the belt (still) and the ring have been removed. (Photo 27)

* When reassembling the pulley (still 1), depress the STILL button, turn the STILL ADJ. knob clockwise and confirm that the clutch (still) becomes engaged.

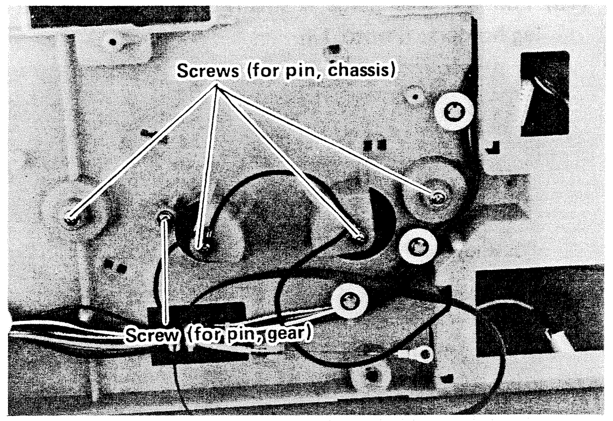
(46) Remove the clutch (still), helical spring (still), shaft (still 2) and pulley (still 2). (Photo 27)


Circuler external ring
Ring
Volume
Pulley (still 1)
Belt (still)
Clutch (still)
Shaft (still 2)
Pulley (still 2)

(Photo 27)

(47) Detach the pins (chassis) located at four places.

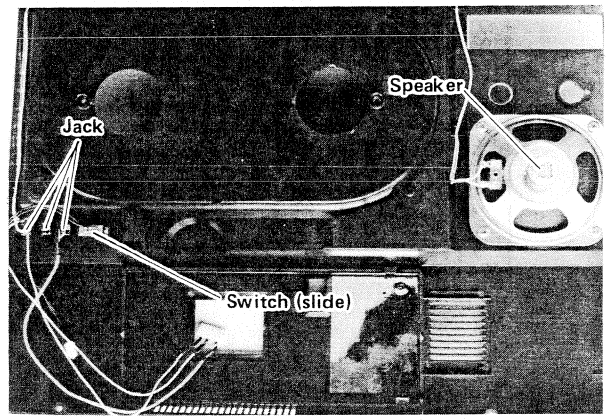
The pins (chassis & gear) are screwed to the chassis from the bottom. (Photo 28)


Screws (for pin, chassis)
Screw (for pin, gear)

(Photo 28)

(48) Detach the accessory parts from the main cover.

The speed selector switch (slide), the rollers (large & small) and the jacks can be detached from the top surface, while the speaker can be dismounted from the bottom. (Photo 29)

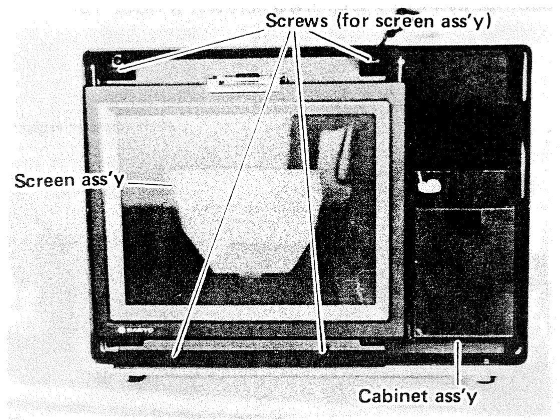

Speaker
Jack
Switch (slide)

(Photo 29)

CABINET

(1) Dismount the screen assembly from the cabinet.

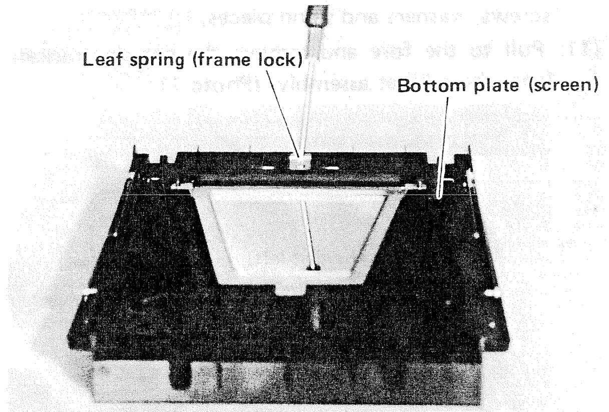
The screen assembly is held to the cabinet with four screws. (Photo 1)


Screws (for screen ass'y)
Screen ass'y
Cabinet ass'y

(Photo 1)

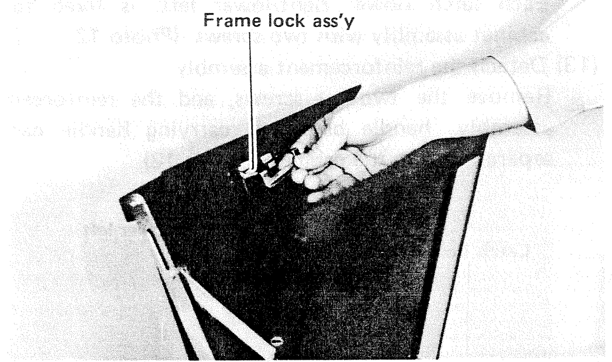
(2) Detach the frame lock assembly.

1) Remove the leaf spring which is screwed to the bottom plate (screen). (Photo 2)


Leaf spring (frame lock)
Bottom plate (screen)

(Photo 2)

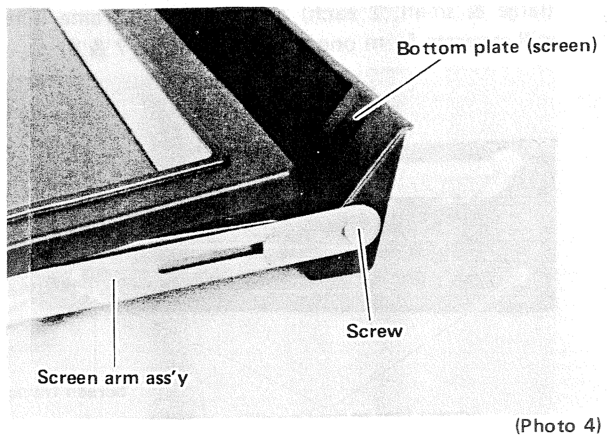
2) Pull out the frame lock assembly to the rear of the bottom plate (screen). (Photo 3)


Frame lock ass'y

(Photo 3)

(3) Remove the bottom plate (screen).

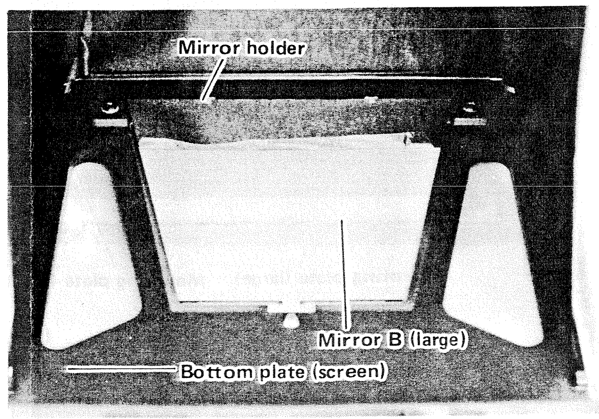
The bottom plate can be separated from the screen arm assemblies with the screws, on each at the right and the left. (Photo 4)


Bottom plate (screen)
Screw
Screen arm ass'y

(Photo 4)

(4) Detach the mirror B (large).

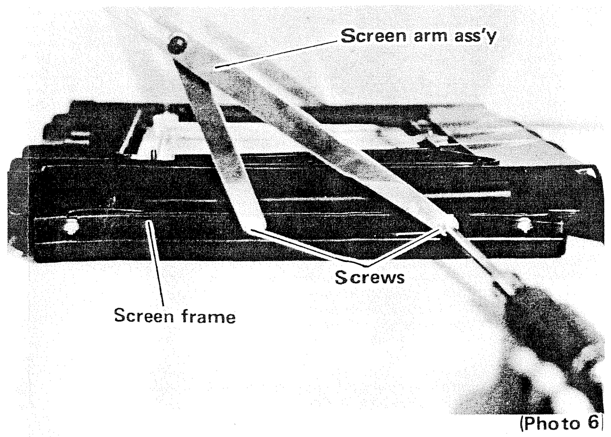
Remove the three set screws and two helical springs, and the mirror holder (large) will separate from the bottom plate (screen). The mirror B is adhered to the mirror holder (large) with adhesive tape. (Photo 5)


Mirror holder
Mirror B (large)
Bottom plate (screen)

(Photo 5)

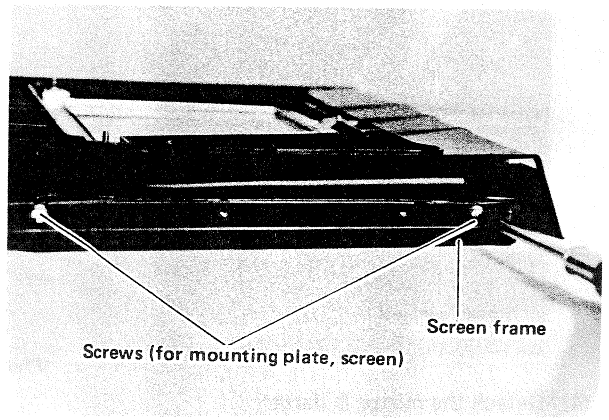
(5) Separate the screen arm assemblies from the screen frame.

The screen arm assemblies are screwed to the screen frame at two places each on the right and left sides. Remove the screws, and the screen frame assemblies, helical springs and washers will come off the screen frame. (Photo 6)

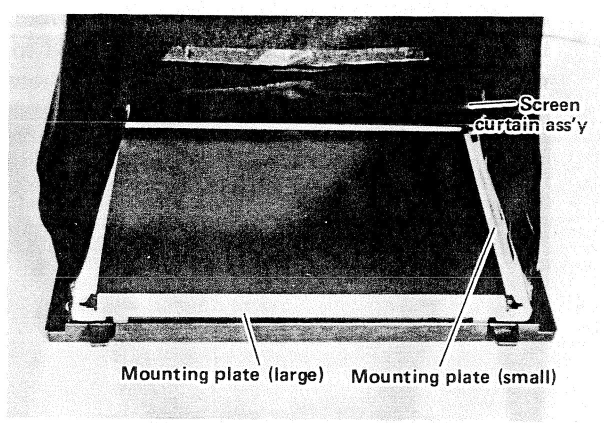

Screen arm ass'y
Screws
Screen frame

(Photo 6)

(6) Separate the screen.
There are two screws each on the left and right sides of the screen assembly. Remove the screws, and the screen curtain assembly, the screen mounting plates (large & small, 2 each) and the screen frame (screen) will separate from one another. (Photos 7 & 8)

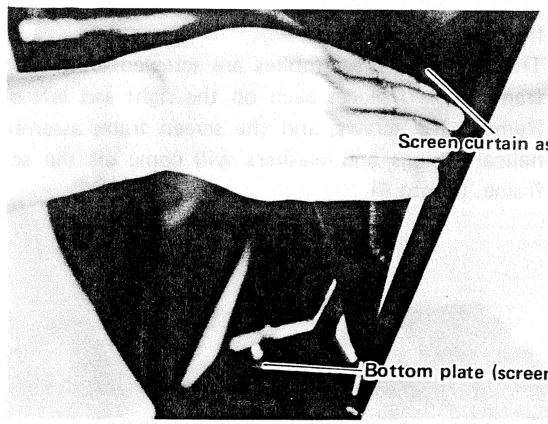

Screen frame
Screws (for mounting plate, screen)

(Photo 7)


Screen curtain ass'y
Mounting plate (large)
Mounting plate (small)

(Photo 8)

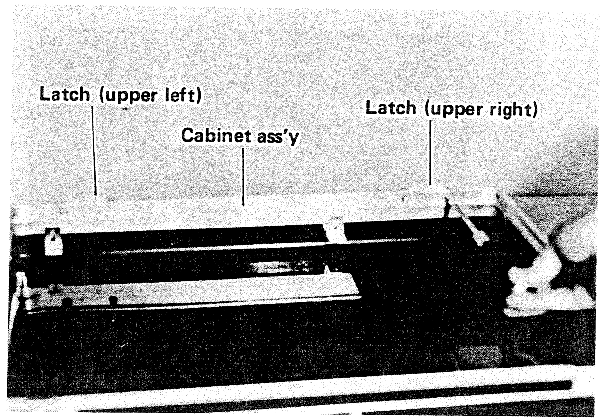
(7) Detach the screen curtain assembly.
Pull the screen curtain assembly off the bottom plate (screen). (Photo 9)


Screen curtain ass'y
Bottom plate (screen)

(Photo 9)

(8) Detach the accessory pocket from the cabinet.
The pocket is adhered to the cabinet case with adhesive tape.

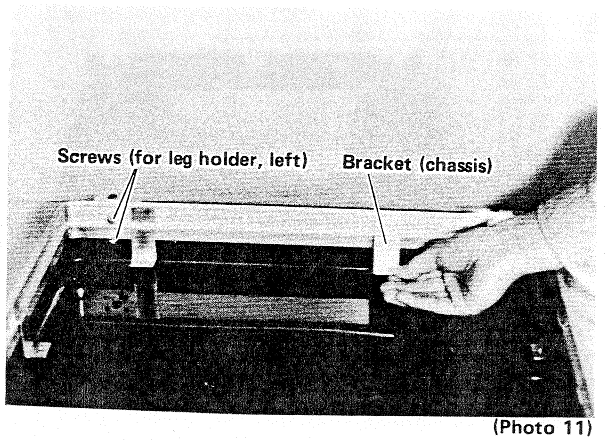
(9) Detach the latches.
Each latch (upper right/upper left) are attached to the cabinet assembly with two screws. (Photo 10)


Latch (upper left)
Cabinet ass'y
Latch (upper right)

(Photo 10)

(10) Detach the stand pieces.
The left and right stand pieces are attached to the cabinet assembly with one screw each. Remove the screws, washers and stand pieces.

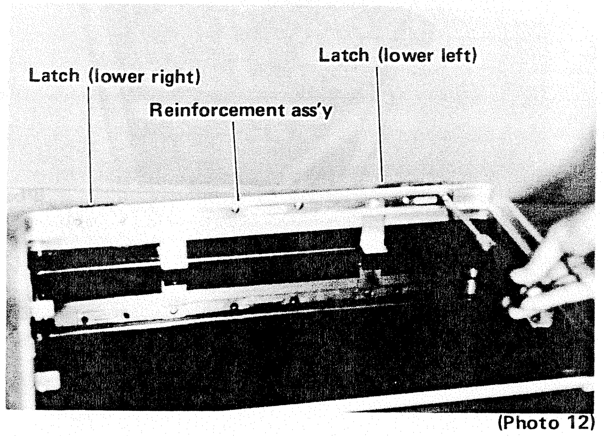
(11) Pull to the fore and remove the chassis brackets (5) from the cabinet assembly. (Photo 11)


Screws (for leg holder, left)
Bracket (chassis)

(Photo 11)

(12) Remove the lower latches.
Each latch (lower right/lower left) is fixed to the cabinet assembly with two screws. (Photo 12)

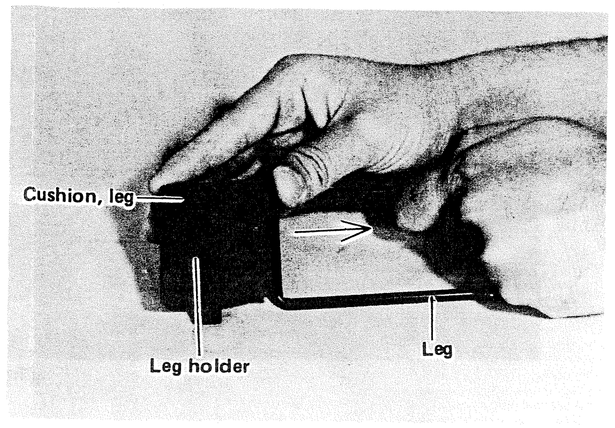
(13) Detach the reinforcement assembly.
Remove the two set screws, and the reinforcement assembly, handle base and carrying handle can be separated from the cabinet. (Photo 12)


Latch (lower right)
Latch (lower left)
Reinforcement ass'y

(Photo 12)

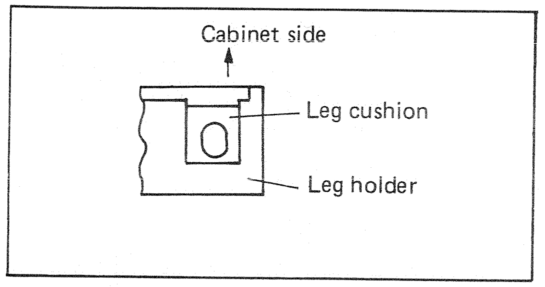
(14) Detach the leg holders.
The left and right leg holders are attached to the cabinet with two screws each. (Photo 11)

(15) Pull the legs (large & small) out of the left and right leg holders. (Photo 13)

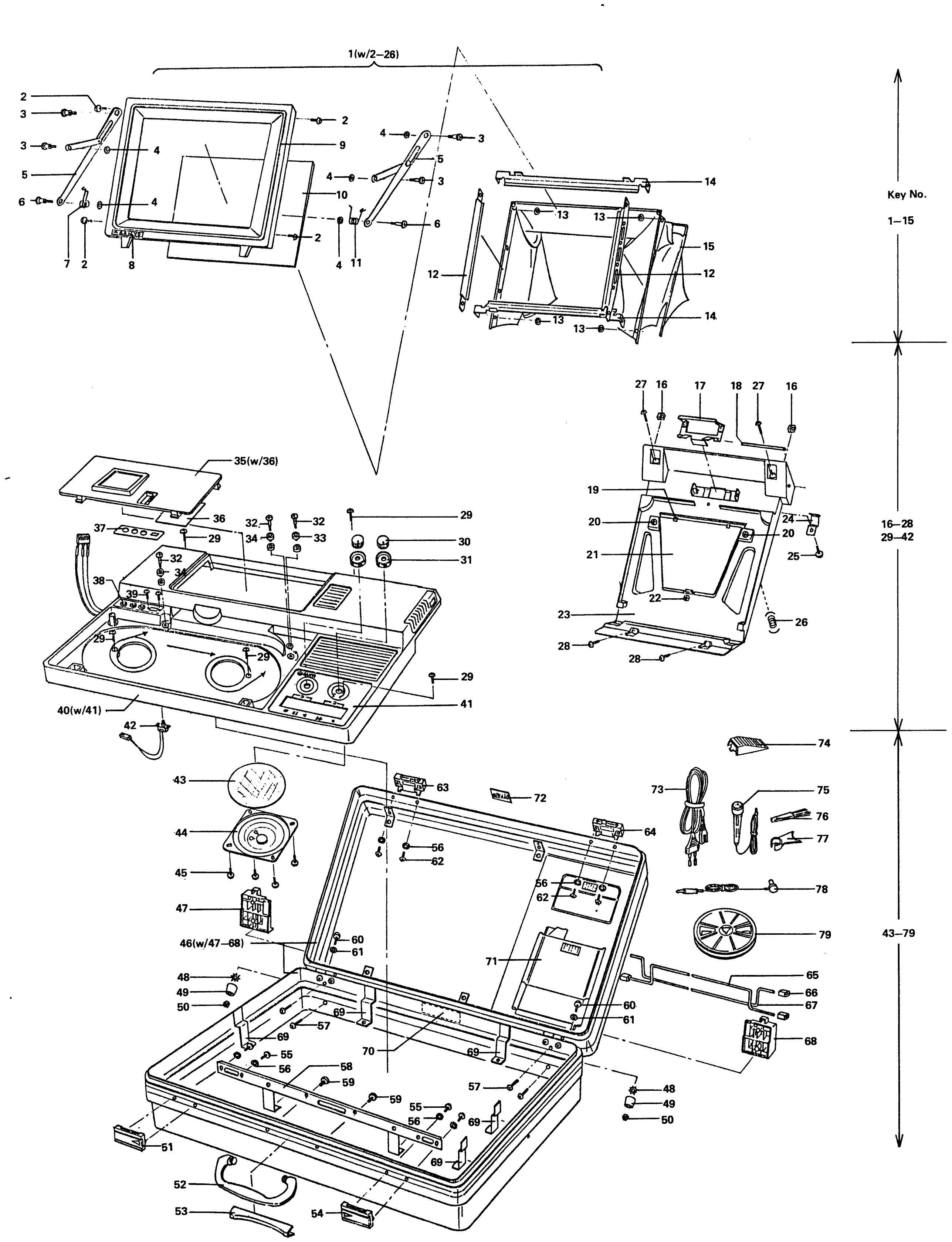

Cushion, leg
Leg holder
Leg

(Photo 13)

* When reassembling the leg holders and the legs, put the cushion into each leg holder with the thick section toward the cabinet as illustrated below.


Cabinet side
Leg cushion
Leg holder

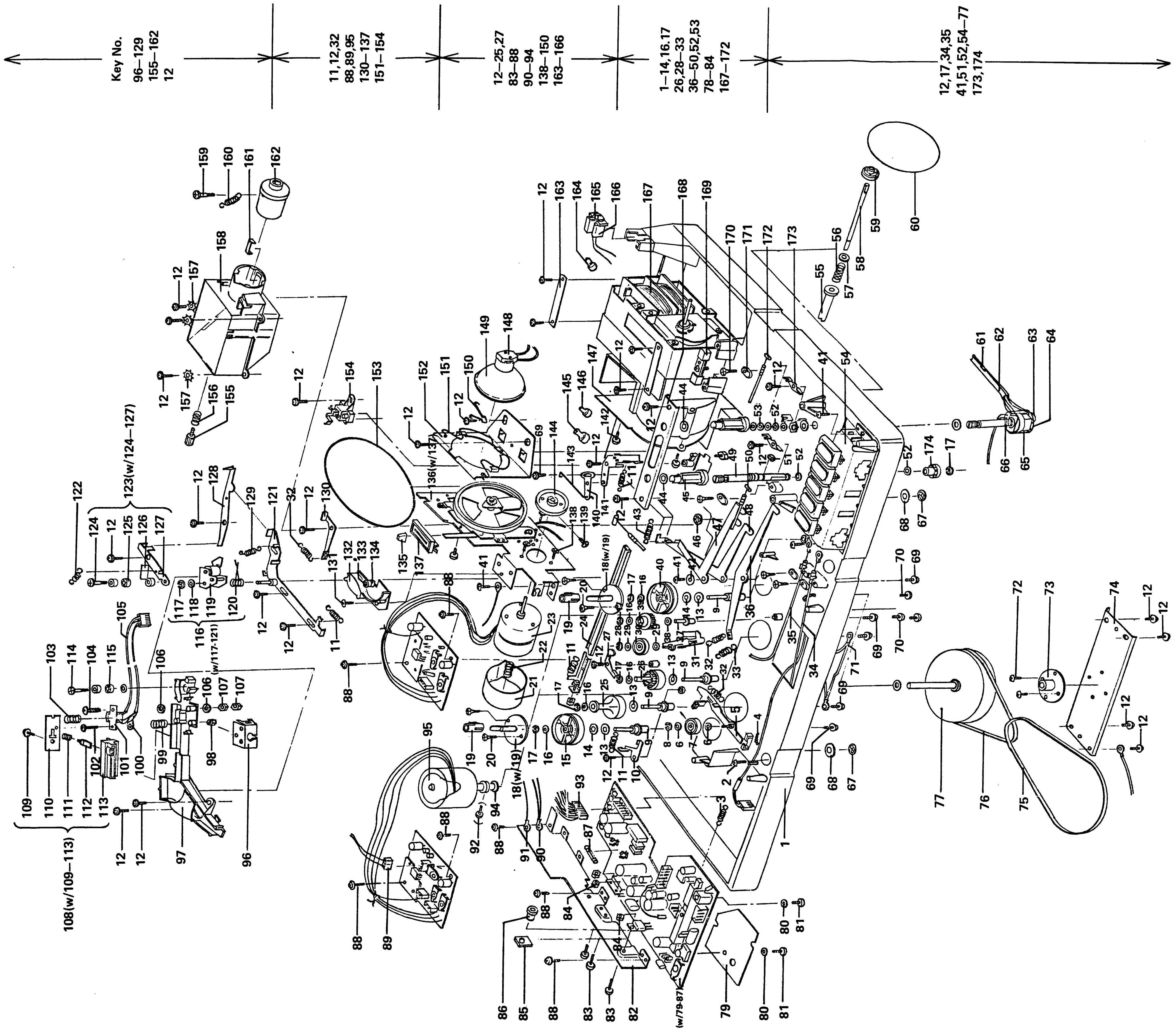
EXPLODED VIEW (CABINET)



PARTS LIST (CABINET)

Key No.	Part No.	Description	Q'ty
1	633-0-2120-00100	Screen assembly (w/2–26)	1
2	101-3-1504-01002	Truss hd. screw, S 4x10mm C2 for Mounting plate	4
3	633-2-8331-00400	Screw, Screen arm (small)	4
4	111-3-1104-01015	Flat washer, S 4x10x1.0mm Z1 for Screw, Screen arm	6
5	633-0-2150-00100	Screen arm assembly	2
6	633-2-8331-00500	Screw, Screen arm (large)	2
7	633-2-8201-00800	Helical spring, Screen arm (right)	1
8	633-2-6124-00100	Ornament panel	1
9	633-2-2102-00101	Screen arm	1
10	633-2-2101-00101	Screen	1
11	633-2-8201-00700	Helical spring, Screen arm (left)	1
12	633-2-2108-00200	Mounting plate, Screen (small)	2
13	111-3-1104-01013	Flat washer, S 4x10x0.5mm Z1 for Screw, Screen arm	4
14	633-2-2108-00100	Mounting plate, Screen (large)	2
15	633-0-2140-00100	Screen curtain assembly	1
16	104-3-1204-00001	Hex. hd. nut 2 S 4.0mm Z1	2
17	633-0-2160-00100	Frame lock assembly	1
18	633-2-8324-00200	Pin, Frame lock	1
19	633-2-2105-00100	Mirror holder (large)	1
20	633-2-8331-01701	Truss hd. screw, S 4x20mm ZK for Mirror holder adjust	2
21	633-2-2106-00200	Mirror B (large)	1
22	101-3-1504-00602	Truss hd. screw, S 4x6mm C2 for Mirror holder	1
23	633-2-2104-00100	Bottom plate, Screen	1
24	633-2-8203-00300	Leaf spring, Frame lock	1
25	102-3-1704-01006	Truss hd. tapping screw 2, S 4x10mm Z1C for Leaf spring, Frame lock	1
26	633-2-8201-01000	Helical spring, Head for Mirror holder adjust	2
27	633-2-8331-01701	Truss hd. screw, S 4x20mm ZK	2
28	633-2-8331-01700	Truss hd. screw, S 4x12mm ZK	2
29	633-2-8331-01900	Truss hd. tapping screw 2, S 3x16mm ZKC for Main cover	5
30	633-0-6220-00100	Knob assembly, Rotary (upper)	2
31	633-0-6220-00200	Knob assembly, Rotary (lower)	2
32	633-2-8331-00800	Screw, Roller	3
33	633-2-6109-00100	Roller (large)	2
34	633-2-6109-00200	Roller (small)	4
35	633-S-6142-00100	Maintenance cover (w/36)	1
36	633-2-8903-00100	Caution label	1
37	633-2-6124-00200	Ornament panel, Jack	1
38	633-0-4100-00200	Lead wire complete, Jack	1
39	101-3-1102-00402	Pan hd. screw, S 2x4mm Z1 for Slide switch	2
40	633-S-6141-00100	Main cover assembly (w/41)	1
41	633-2-6124-00500	Ornament panel, Switch	1
42	633-0-4100-00400	Lead wire complete, Slide switch	1
43	633-2-3105-00200	Net, Speaker	1
44	633-2-3104-00100	Speaker	1
45	102-3-1704-01006	Truss hd. tapping screw 2 S 4x10mm Z1C for Speaker	4
46	633-0-1110-00101	Cabinet assembly (w/47–68)	1
47	633-2-1112-00200	Leg holder (right)	1
48	105-3-1504-00003	External tooth lock washer, K 4.0mm Z1 for Stand piece	2
49	366-2-1135-00101	Stand piece	2
50	104-3-1204-00001	Hex. hd. nut 2, S 4.0mm Z1 for Stand piece	2
51	633-2-1105-00201	Latch (lower, left)	1
52	633-2-1103-00100	Carrying handle	1
53	633-2-1104-00100	Handle base	1
54	633-2-1105-00200	Latch (lower, right)	1
55	633-2-8331-01200	Truss hd. screw, S 3x8mm Z2 for Latch	4
56	105-3-1203-00003	Spring washer, S 3.0mm for Latch	8
57	102-3-1704-01402	Truss hd. tapping screw 2, S 4x14mm Z1C for Leg	4
58	633-0-1120-00100	Reinforcement assembly	1
59	101-3-1105-01001	Pan hd. Screw, S 5x10mm Z1 for Handle base	2
60	101-3-1504-01001	Truss hd. screw, S 4x10mm Z1 for Stand piece	2
61	111-3-1104-01301	Flat washer, S 4x13x0.8mm Z1 for Stand piece	2
62	633-2-8331-01100	Truss hd. Screw, S 3x4mm Z2 for Latch	4
63	633-2-1105-00101	Latch (upper, left)	1
64	633-2-1105-00100	Latch (upper, right)	1
65	633-2-1111-00200	Leg (small)	1
66	633-2-6127-00200	Cushion, Leg	4
67	633-2-1111-00100	Leg (large)	1
68	633-2-1112-00100	Leg holder (left)	1
69	633-2-1109-00300	Bracket, Chassis	5
70	633-2-8901-00200	Name plate	1
71	633-2-1106-00100	Accessory pocket	1
72	633-2-6124-00400	Ornament panel	1
73	633-0-8510-00200	Cord complete	1
74	633-0-6250-00100	Cutter assembly	1
75	633-2-3106-00100	Microphone	1
76	633-2-6151-00100	Cleaning brush	1
77	633-2-6149-00200	Stand, Microphone	1
78	633-2-3107-00100	Earphone	1
79	633-2-6145-00100	Reel	1

EXPLODED VIEW (CHASSIS)



PARTS LIST (CHASSIS)

Key No.	Part No.	Description	Q'ty
1	633-S-6200-00100	Chassis complete	1
2	102-3-1704-01203	Truss hd. tapping screw 2, S 4x12mm Z1C for Chassis	6
3	633-2-8201-02900	Helical spring, Record	1
4	336-2-8511-00300	Cord band	8
5	633-0-6160-00201	Link assembly, Reel (left)	1
6	111-3-1103-00701	Flat washer, S 3x7x0.5mm Z1 for Roller	2
7	633-0-6110-00200	Roller assembly, Reel	1
8	108-3-1102-00004	E ring, K 2.0mm Z2 for Roller	1
9	633-2-8324-01200	Pin, Chassis	4
10	633-2-6108-00400	Lever, Play 3	1
11	633-2-8201-01700	Helical spring A for Link, Pinch: Lever, Still 2 & Lever, Play 3	4
12	633-2-8331-01500	Button hd. tapping screw 2, S washer head 3x12mm Z1C	29
13	111-3-1106-01211	Flat washer, W 6x12x0.5mm for Pin	5
14	111-3-1106-01216	Flat washer, W 6x12x0.25mm for Pin	3
15	633-0-6180-00200	Reel holder assembly (lower) for Play	1
16	111-3-1104-00703	Flat washer, S 4x7x0.35mm Z1 for Pin	7
17	108-3-1103-00008	E ring, K 3.0mm Z2 for Pin (5) Shaft, Still (1)	6
18	633-0-6180-00100	Reel holder assembly (upper)	2
19	633-2-6115-00100	Sleeve, Reel	1
20	102-3-2403-01005	Flat hd. tapping screw 2, S 3x10mm ZKC for Reel holder	4
21	633-2-3112-00200	Shield cover, Motor	1
22	331-2-8201-17500	Helical spring	1
23	527-0-001K-85100	Motor complete, Aperture	1
24	633-0-6160-00300	Link assembly, Play 2	1
25	633-2-6101-00500	Pulley, Play reel	1
26	633-2-6101-00600	Pulley, Rewind reel	1
27	633-2-6108-00600	Lever, Play 4	1
28	108-3-1102-00004	E ring, K 2.0mm Z2 for Roller	1
29	111-3-1103-00701	Flat washer, S 3x7x0.5mm Z1 for Roller	2
30	633-0-6110-00200	Roller assembly, Reel	1
31	633-0-6160-00200	Link assembly, Reel (right)	1
32	633-2-8201-02600	Helical spring H for Lever P,P & Link, Reel	3
33	633-2-8201-01900	Helical spring C for Lever, Rewind	1
34	633-0-6140-00200	Flexible wire complete, Record	1
35	633-0-6140-00100	Flexible wire complete, Pressure plate	1
36	633-2-6108-01000	Lever, Rewind	1
37	633-2-8324-01300	Pin, Gear	1
38	111-3-1104-00802	Flat washer H, 4x8x0.5mm for Gear	1
39	633-2-6134-00100	Gear, Rewind	1
40	633-0-6180-00300	Reel holder assembly (lower)	1
41	102-3-1704-01402	Truss hd. tapping screw 2, S 4 x 14mm Z1C for Aperture (2), Switch (2), Lever (1)	5
42	111-3-1104-01301	Flat washer, S 4x13x0.8mm Z1 for Lever, Play 1, Lever, Still 1	1
43	633-2-8201-02700	Helical spring I,for Lever, Still 1	1
44	111-3-1110-01507	Flat washer, S 10x15x0.4mm Z1 for Cam, Focus	2
45	633-2-5104-00300	Cam, Focus	2
46	322-2-8302-10200	Speed Tinnerman flat nut, U 3.0mm	1
47	633-2-6108-00300	Lever, Play 1	1
48	633-2-6108-00700	Lever, Still 1	1
49	633-2-6131-00100	Shaft, Still 1	1
50	633-0-6140-00400	Flexible wire complete, Frame	1
51	108-3-1105-00007	E Ring, K 5.0mm Z2 for Shaft, Still	1

PARTS LIST (CHASSIS)

Key No.	Part No.	Description	Q'ty
52	111-3-1106-01217	Flat washer, S 6x12x0.5mm Z1 for Cam, Focus	7
53	331-2-8301-19900	Washer	4
54	633-0-8400-00200	Switch assembly, Main	1
55	633-2-6132-00100	Clutch, Still	1
56	633-2-8201-02500	Helical spring, Still	1
57	111-3-1105-01003	Flat washer, S 5x10x0.5mm Z1 for Shaft, Still 2	1
58	633-2-6131-00200	Shaft, Still 2	1
59	633-2-6101-00400	Pulley, Still 2	1
60	633-2-6102-00200	Belt, Still	1
61	633-0-4100-00900	Lead wire complete	1
62	633-2-3122-00600	Insulating tubing, 8x260x1.0mm	1
63	633-2-7114-03801	H-P lead wire (White) L=380	2
64	633-2-7114-03401	H-P lead wire (Black) L=340	1
65	633-2-3122-00700	Insulating tubing, 30x28Lx1.0mm	1
66	633-2-3102-00200	Volume	1
67	633-2-6138-00200	Circuler external ring	7
68	331-2-8301-17311	Flat washer, E 4.2x17x1.0mm	7
69	633-2-8331-01600	Pan hd. Screw, S Washer head 3x8mm Z1 for Pin (5), Lever, Still 3 (1)	6
70	101-3-1102-60401	Pan hd. screw, S 2.6x4mm Z1 for Motor assembly	3
71	633-0-4100-00700	Lead wire complete, Earth for Switch	1
72	102-3-1203-00603	Pan hd. tapping screw 2, S 3x6mm Z1C for Support	2
73	633-2-6139-00100	Support, Flywheel	1
74	633-2-6106-00400	Plate, Flywheel	1
75	633-2-6102-00400	Belt, Reel	1
76	633-2-6102-00300	Belt, Flywheel	1
77	633-0-6120-00100	Flywheel assembly	1
78	633-0-3110-00101	Printed circuit assembly	1
79	633-2-3112-00300	Shield cover, Amp	1
80	111-3-1103-01002	Flat washer, S 3x10mm Z1C	2
81	102-3-1203-01006	Pan hd. tapping screw 2, S 3x10mm Z1C	2
82	633-2-3113-00100	Radiator	1
83	101-3-1103-01001	Pan hd. screw, S 3x10mm Z1 for Radiator	3
84	104-3-1103-00002	Hex. hd. nut, S 3.0mm Z1 for Radiator	3
85	633-2-6104-00500	Pad, Transistor, IS-313D	1
86	633-2-6115-00300	Sleeve	1
87	633-2-4104-00200	Fuse, 800mA (FUSE), Amp	1
88	633-2-8331-01500	Button hd. tapping screw 2, S washer head 3x12mm ZIC for Printed board	7
89	633-0-4100-00500	Lead wire complete, Aperture	1
90	633-0-4100-00600	Lead wire complete, Earth for Flywheel	1
91	633-0-4100-00800	Lead wire complete, Earth for Aperture	1
92	101-3-1102-00601	Pan hd. screw, S 2x6mm Z1 for Pulley	1
93	633-0-4100-00100	Lead wire complete, Main	1
94	633-2-6101-00200	Pulley, Reel motor	1
95	527-0-001K-85200	Motor complete	1
96	633-2-3112-00100	Sealed cover	1
97	633-0-6130-00100	Loader assembly (large)	1
98	104-3-1102-00001	Hex. hd. nut, B 2.0mm N1 for Head adjust	1
99	633-2-8201-01000	Helical spring, Head	1
100	531-2-2231-00200	Cap lag	1
101	633-2-3111-00100	Head	1
102	101-3-1102-01601	Pan hd. screw, S 2x16mm Z1 for Head adjust	1
103	633-2-8201-02500	Helical spring, Still for Sealed cover earth	1
104	633-2-8331-01300	Screw, Head	1
105	633-0-4100-00300	Lead wire complete, Head	1
106	633-2-8301-00400	Flat washer, K 3x7x0.2mm	2
107	104-3-1103-00002	Hex. hd. nut S 3.0 mm Z1	2
108	633-0-6100-00100	Pad assembly (w/109—113)	1
109	633-2-8331-01400	Button hd. tapping screw 2, S washer head 3x10mm Z1C	1
110	633-2-6106-00100	Plate, Pad holder	1
111	633-2-8201-01100	Helical spring, Pad	1
112	633-2-6104-00100	Pad	1
113	633-2-6105-00100	Pad holder	1
114	633-2-8331-00900	Screw, Roller (large)	1
115	633-2-6109-00200	Roller (small)	1
116	633-0-6150-00100	Link complete, Pinch (w/117—121)	1
117	108-3-1103-00008	E Ring, K 3.0mm Z2 for Lever assembly, Pinch	1
118	111-3-1104-00703	Flat washer, S 4x7x0.35mm Z1	1
119	633-0-6170-00200	Lever assembly, Pinch	1
120	633-2-8201-01200	Helical spring, Pinch	1
121	633-0-6160-00100	Link assembly, Pinch	1
122	633-2-8201-02200	Helical spring F for Lever, Pad lock	1
123	633-0-6170-00100	Lever assembly, Pad lock (w/124—127)	1
124	633-2-8331-00800	Screw, Roller	1
125	633-2-6109-00100	Roller (large)	2
126	633-2-6146-00100	Guide, Pad	1
127	633-2-6108-00200	Lever, Pad lock	1
128	633-2-6108-00500	Lever, Pad	1
129	633-2-8201-02100	Helical spring E for Lever, Pad	1
130	633-2-6108-01200	Lever, Pressure plate	1
131	101-3-1103-00403	Pan hd. screw, S 3x4mm ZK for Loader (small)	1
132	633-0-6130-00200	Loader assembly (small)	1
133	633-2-8331-00800	Screw, Roller for Roller (small)	1
134	633-2-6109-00200	Roller (small)	2
135	633-2-6143-00100	Knob, Aperture	1
136	633-0-5110-00100	Aperture assembly (w/137)	1
137	633-0-5180-00100	Lever ornament assembly	1
138	101-3-1102-60401	Pan hd. screw, S 2.6x4mm Z1 for Motor, Aperture	3
139	101-3-1102-00601	Pan hd. screw, S 2x6mm Z1 for Pulley, Aperture	1
140	633-2-6108-00900	Lever, Still 3	1
141	633-2-6108-00800	Lever, Still 2	1
142	102-3-1704-01006	Truss hd. tapping screw 2, S 4x10mm Z1C for Plate, Fan case	2
143	633-2-6129-00200	Wire, Still	1
144	633-0-6230-00100	Pulley assembly, Aperture motor	1
145	331-2-8524-10200	Wire connector	4
146	336-2-8524-00200	Wire connector	4
147	633-2-6106-00200	Plate, Fan case	1
148	633-2-2118-00100	Socket	1
149	633-2-2117-00100	Projector lamp (8V-50W)	1
150	633-2-2112-00200	Spring, Lamp	1
151	633-2-2112-00100	Spring, Lamp	1
152	633-2-2111-00100	Lamp holder	1
153	633-2-6102-00100	Belt, Aperture	1
154	633-0-8410-00200	Switch, Control	1
155	531-2-1145-01200	Head cap set screw for Mirror adjust	1
156	331-2-8201-10101	Helical spring for Mirror adjust	1
157	105-3-1503-00002	External tooth lack washer, K 3.0mm Z1 for Lens holder	3
158	633-S-2113-00100	Lens holder complete	1
159	633-2-8324-01000	Pin, Focus	1
160	633-2-8201-02000	Helical spring D for Lens	1
161	633-2-8203-00700	Leaf spring, Lens	1
162	633-2-2114-00100	Projector lens	1
163	633-2-6106-00300	Plate, Fan motor	2
164	336-2-8524-00200	Wire connector	2
165	633-2-4101-00101	Inlet socket	1
166	633-2-4102-00100	Socket cover	1
167	524-S-010K-50104	Motor complete (220V), w/Fan	1
168	633-2-6133-00100	Cam holder	1
169	633-2-6127-00100	Cushion, Fan motor	4
170	102-3-2304-01202	Round hd. tapping screw 2, S 4x12mm ZIC for Outer retainer	4
171	633-2-6128-00100	Outer retainer	4
172	633-0-6140-00300	Flexible wire complete, Focus	1
173	633-2-6108-01100	Lever, Cam	2
174	633-2-6101-00300	Pulley, Still 1	1

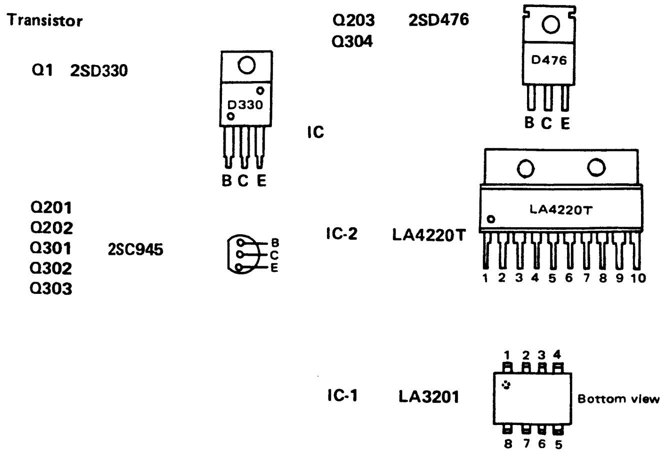
PARTS LIST (ELECTRICAL PARTS)

Key No.	Part No.	Description	Q'ty
PRINTED CIRCUIT BOARD ASS'Y (AMP)			
78	633-0-3110-00101	Printed circuit assembly	1
(2)	633-2-3109-00101	Printed board, Main	1
IC-1	633-2-3114-00100	IC, LA3201	1
IC-2	633-2-3114-00200	IC, LA4220T	1
Q1	2SD-T-3300-ES000	Transistor, 2SD330E	1
D1,D2	A00-D-00MI-151A0	Diode, MI151	1
D3,D4	A00-D-0MI1-51RA0	Diode, MI151R	1
D5	A00-D-1S18-8AMS0	Diode, 1S188AM	1
D6 ~D13	A00-D-0DS1-50AS0	Diode, DS150A	8
ZD1	B00-D-RD4R-7ECN0	Diode, RD4.7EC	1
R1	C14-R-431J-UM000	Carbon, 430 ohm ±5% ¼W	1
R2,R14	C14-R-104J-PM000	Carbon, 100K ohm ±5% ¼W	2
R3,R19 R26	C14-R-332J-PM000	Carbon, 3.3K ohm ±5% ¼W	3
R4	C14-R-473J-UM000	Carbon, 47K ohm ±5% ¼W	1
R5	C14-R-333J-UM000	Carbon, 33K ohm ±5% ¼W	1
R6	C14-R-222J-UM000	Carbon, 2.2K ohm ±5% ¼W	1
R7	C14-R-102J-UM000	Carbon, 1K ohm ±5% ¼W	1
R8	B17-R-751J-PM000	Carbon, 750 ohm ±5% ½W	1
R9	C14-R-472J-UM000	Carbon, 4.7K ohm ±5% ¼W	1
R10	C14-R-124J-UM000	Carbon, 120K ohm ±5% ¼W	1
R11	C14-R-682J-UM000	Carbon, 6.8K ohm ±5% ¼W	1
R12	C14-R-104J-UM000	Carbon, 100K ohm ±5% ¼W	1
R13 R17	C14-R-331J-UM000	Carbon, 330 ohm ±5% ¼W	2
R16	B17-R-470J-PM000	Carbon, 47 ohm ±5% ½W	1
R18	C14-R-391J-UM000	Carbon, 390 ohm ±5% ¼W	1
R20	C14-R-273J-UM000	Carbon, 27K ohm ±5% ¼W	1
R21	C14-R-100J-UM000	Carbon, 10 ohm ±5% ¼W	1
R22	B17-R-200J-PM000	Carbon, 20 ohm ±5% ½W	1
R23	C14-R-828J-UM000	Carbon, 8.2 ohm ±5% ¼W	1
R24	C14-R-822J-UM000	Carbon, 8.2K ohm ±5% ¼W	1
R25	C14-R-471J-UM000	Carbon, 470 ohm ±5% ¼W	1
C1	C17-C-1030-ZDA00	Ceramic, 0.01μF +80–20% 50V	1
C2	C17-C-5610-KDA00	Ceramic, 560pF ±10% 50V	1
C3,C9	E14-C-4780-AES00	Electrolytic, 4.7μF +100–10% 25V	2
C4	C17-C-1020-ZDA00	Ceramic, 0.001μF +80–20% 50V	1
C5	E10-C-2200-AES00	Electrolytic, 22μF +100–10% 10V	1
C6	E10-C-4700-AES00	Electrolytic, 47μF +100–10% 10V	1
C7	C17-C-1010-KDA00	Ceramic, 100pF ±10% 50V	1
C8	E10-C-2210-AES00	Electrolytic, 220μF +100–10% 10V	1
C10	F17-C-1530-JKA00	Polyester film, 0.015μF ±5% 50V	1
C11	E14-C-1080-AES00	Electrolytic, 1μF +100–10% 25V	1
C12 C20	E14-C-2210-AES00	Electrolytic, 220μF +100–10% 25V	2
C13	E14-C-3300-AES00	Electrolytic, 33μF +100–10% 25V	1
C14	C17-C-4700-KDA00	Ceramic, 47pF ±10% 50V	1
C15 C24	F17-C-1030-KKA00	Polyester film, 0.01μF ±10% 50V	2
C16	E14-C-4700-AES00	Electrolytic, 47μF +100–10% 25V	1
C17	E14-C-1000-AES00	Electrolytic, 10μF +100–10% 25V	1
C18	F17-C-1540-KKA00	Polyester film, 0.15μF ±10% 50V	1
C19	E14-C-4710-AES00	Electrolytic, 470μF +100–10% 25V	1
C21	F17-C-2220-JKA00	Polyester film, 0.0022μF ±5% 50V	1
C22	F26-C-1520-KKA00	Polyester film, 0.0015μF ±10% 400V	1
C23	E14-C-1010-AES00	Electrolytic, 100μF +100–10% 25V	1
PRINTED CIRCUIT BOARD ASS'Y (AMP)			
C25	F26-C-4720-KKA00	Polyester film, 0.0047μF ±10% 400V	1
C26	E14-C-1020-AES00	Electrolytic, 1000μF +100–10% 25V	1
C27 C28	E17-C-4710-AES00	Electrolytic, 470μF +100–10% 50V	2
VR2	V10-R-5033-B1M00	Variable, 50K ohm B 1/10W	1
VR3	V10-R-2023-B1M00	Variable, 2K ohm B 1/10W	1
OSC,C	633-2-3115-00100	Oscillation coil	1
TRAP,C	633-2-3116-00100	Trap coil	1
S1-1-6	633-0-8410-00500	Slide switch	1
MC-1	633-2-3117-00800	Micro connector, 8P	1
MC-2	633-2-3117-00500	Micro connector, 5P	1
MC-3	633-2-3117-00300	Micro connector, 3P	1
MC-4	633-2-3117-00900	Micro connector, 9P	1
FUSE 1	633-2-4104-00200	Fuse(AMP) 800mAT	1
(1)	633-2-4103-00300	Fuse holder	2
	633-2-7114-00801	H-P lead wire (Black) L=80	2
	633-2-3121-00400	Shield cable	1
(13)	633-2-3122-00200	Insulating tubing, 1.3x13mm L	2
(14)	633-2-3122-00201	Insulating tubing, 3.3x12mm L	2
(15)	111-3-1103-00701	Flat washer, S3x7x0.5mm Z1	1
B	633-2-3127-00100	Braker, TBC 5823-01-002	1
MOTOR, REEL DRIVE			
95	527-0-001K-85200	Motor complete	1
	527-0-010K-85200	Motor assembly	1
	633-0-3110-00300	Printed circuit assembly	1
	633-2-3109-00400	Printed board	1
Q201 Q202	2SC-T-9450-0QN00	Transistor, 2SC945	2
Q203	2SD-T-4760-0BH00	Transistor, 2SD476	1
D201	A00-D-01S2-075H0	Diode, 1S2075	1
D202	A00-D-001S-953N0	Diode, 1S953	1
R201	C14-R-221J-U0000	Carbon, 220 ohm ±5% ¼W	1
R203	C14-R-390J-U0000	Carbon, 39 ohm ±5% ¼W	1
R205		Carbon, 0-1K ohm ±5% ¼W	1
R206	C14-R-471J-U0000	Carbon, 470 ohm ±5% ¼W	1
R207	C14-R-561J-U0000	Carbon, 560 ohm ±5% ¼W	1
R208	C14-R-154J-U0000	Carbon, 150K ohm ±5% ¼W	1
R209	C14-R-223J-U0000	Carbon, 22K ohm ±5% ¼W	1
R210	C14-R-183J-U0000	Carbon, 18K ohm ±5% ¼W	1
C201 C203	E17-C-2200-AEZ00	Electrolytic, 22μF +100–10% 50V	2
C204	C17-C-1030-ZDZ00	Ceramic, 0.01μF +80–20% 50V	1
VR201	V10-R-5013-B1000	Variable, 500 ohm B 1/10W	1
VR202 VR203	V10-R-2013-B1000	Variable, 200 ohm B 1/10W	2
TH201	633-2-3126-00100	Thermista, SDT-20	1
MC201	633-2-3117-00300	Micro connector, 3P	1
MC202 MC203	633-2-3117-00200	Micro connector, 2P	2
	633-2-3113-00200	Radiator	1
	633-2-6104-00600	Pad, Transistor	1
	633-2-6115-00400	Sleeve	1
	102-3-1303-00601	Pan hd. tapping screw 3, S 3x6mm Z1 for Radiator	2
	101-3-1103-01001	Pan hd. screw, S 3x10mm Z1 for Transistor	1
	104-3-1103-00002	Hex. hd. nut 1, S 3.0mm Z1 for Transistor	1

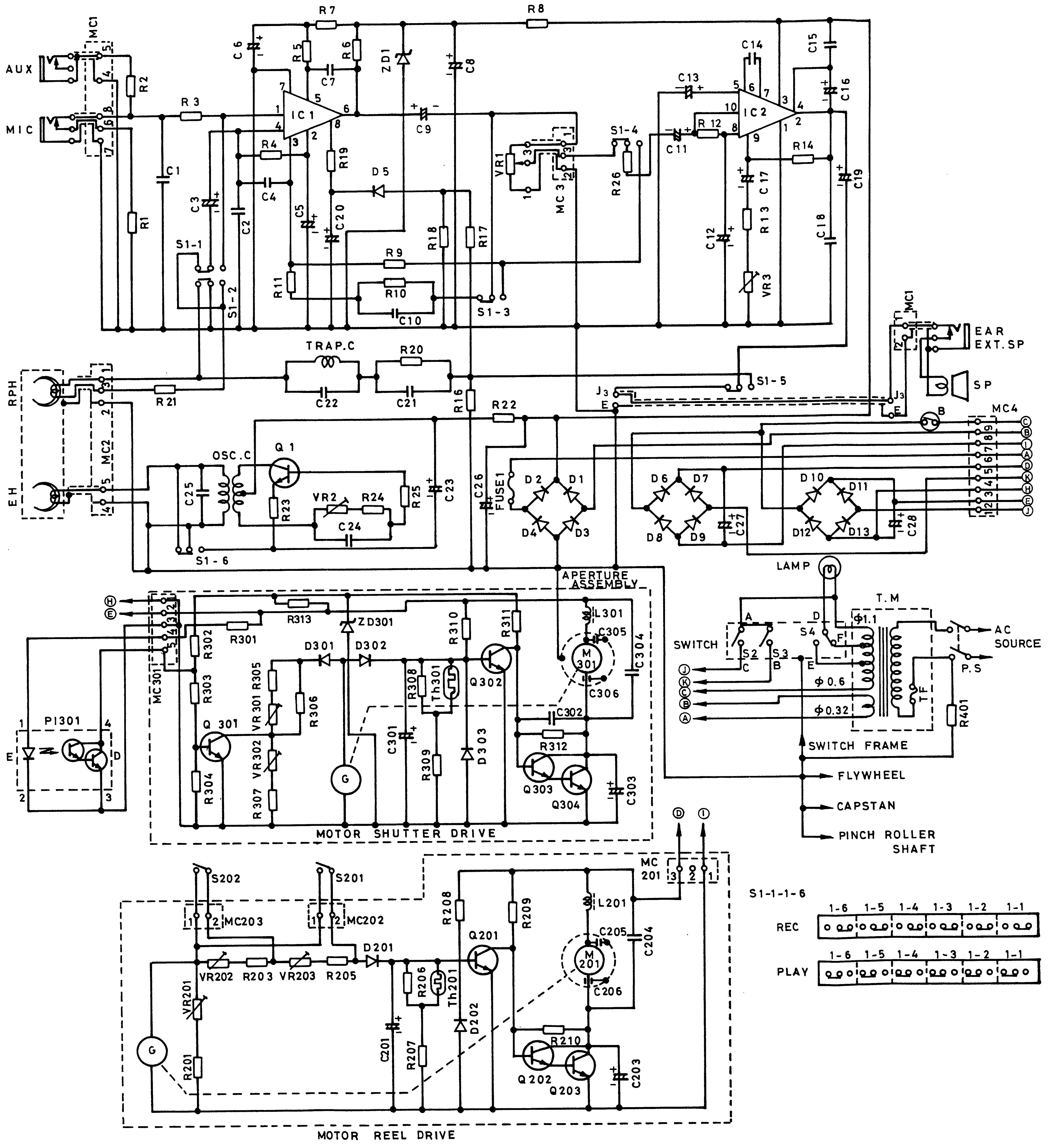
PARTS LIST (ELECTRICAL APRTS)

Key No.	Part No.	Description	Q'ty
MOTOR, SHUTTER DRIVE			
23	527-0-001K-85100	Motor complete, Aperture	1
	527-0-010K-85100	Motor assembly, Aperture	1
	633-0-3110-00200	Printed circuit assembly	1
	633-2-3109-00300	Printed board, Aperture	1
Q301, Q302 Q303	2SC-T-9450-0QN00	Transistor, 2SC945	3
Q304	2SD-T-4760-0BH00	Transistor, 2SD476	1
D301, D302	A00-D-01S2-075H0	Diode, 1S2075	2
D303	A00-D-001S-953N0	Diode, 1S953	1
ZD301	B00-D-0RD1-2ECN0	Diode, NEC RD12EC	1
R301	E20-R-182J-P0000	Resistor, 1.8K ohm ±5% 1W	1
R302	C14-R-223J-U0000	Carbon, 22k ohm ±5% ¼W	1
R303	C14-R-203J-U0000	Carbon, 20K ohm ±5% ¼W	1
R304	C14-R-512J-U0000	Carbon, 5.1K ohm ±5% ¼W	1
R305, R307	C14-R-390J-U0000	Carbon, 39 ohm ±5% ¼W	1
R306	C14-R-221J-U0000	Carbon, 220 ohm ±5% ¼W	1
R308	C14-R-471J-U0000	Carbon, 470 ohm ±5% ¼W	1
R309	C14-R-561J-U0000	Carbon, 560 ohm ±5% ¼W	1
R310	C14-R-154J-U0000	Carbon, 150K ohm ±5% ¼W	1
R311	C14-R-103J-U0000	Carbon, 10K ohm ±5% ¼W	1
R312	C14-R-183J-U0000	Carbon, 18K ohm ±5% ¼W	1
R313	E20-R-102J-P0000	Resistor, 1K ohm ±5% 1W	1
C301, C303	E17-C-2200-AEZ00	Electrolytic, 22μF +100—10% 50V	2
C302	C17-C-2030-ZDZ00	Ceramic, 0.02μF +80—20% 50V	1
C304	C17-C-1030-ZDZ00	Ceramic, 0.01μF +80—20% 50V	1
VR301	V10-R-2013-B1000	Variable, 200 ohm B 1/10W	1
VR302	V10-R-5013-B1000	Variable, 500 ohm B 1/10W	1
TH301	633-2-3126-00100	Thermista, SDT-20	1
MC301	633-2-3117-00500	Micro connector, 5P	1
	633-2-3113-00200	Radiator	1
	633-2-6104-00600	Pad, Transistor	1
	633-2-6115-00400	Sleeve	1
	633-2-3122-00500	Insulating tubing, 1x24xT0.3	1
	633-2-3122-00501	Insulating tubing, 1x12xT0.3	1
	102-3-1303-00601	Pan hd. tapping screw 3, S 3x6mm Z1 for Radiator	2
	101-3-1103-01001	Pan hd. screw, S 3x10mm Z1 for Transistor	1
	104-3-1103-00002	Hex. hd. nut 1, S 3.0mm Z1 for Transistor	1
ELECTRICAL PARTS			
R401	H17-R-475K-PM000	Solid, 4.7M ohm ±10% ½W	1

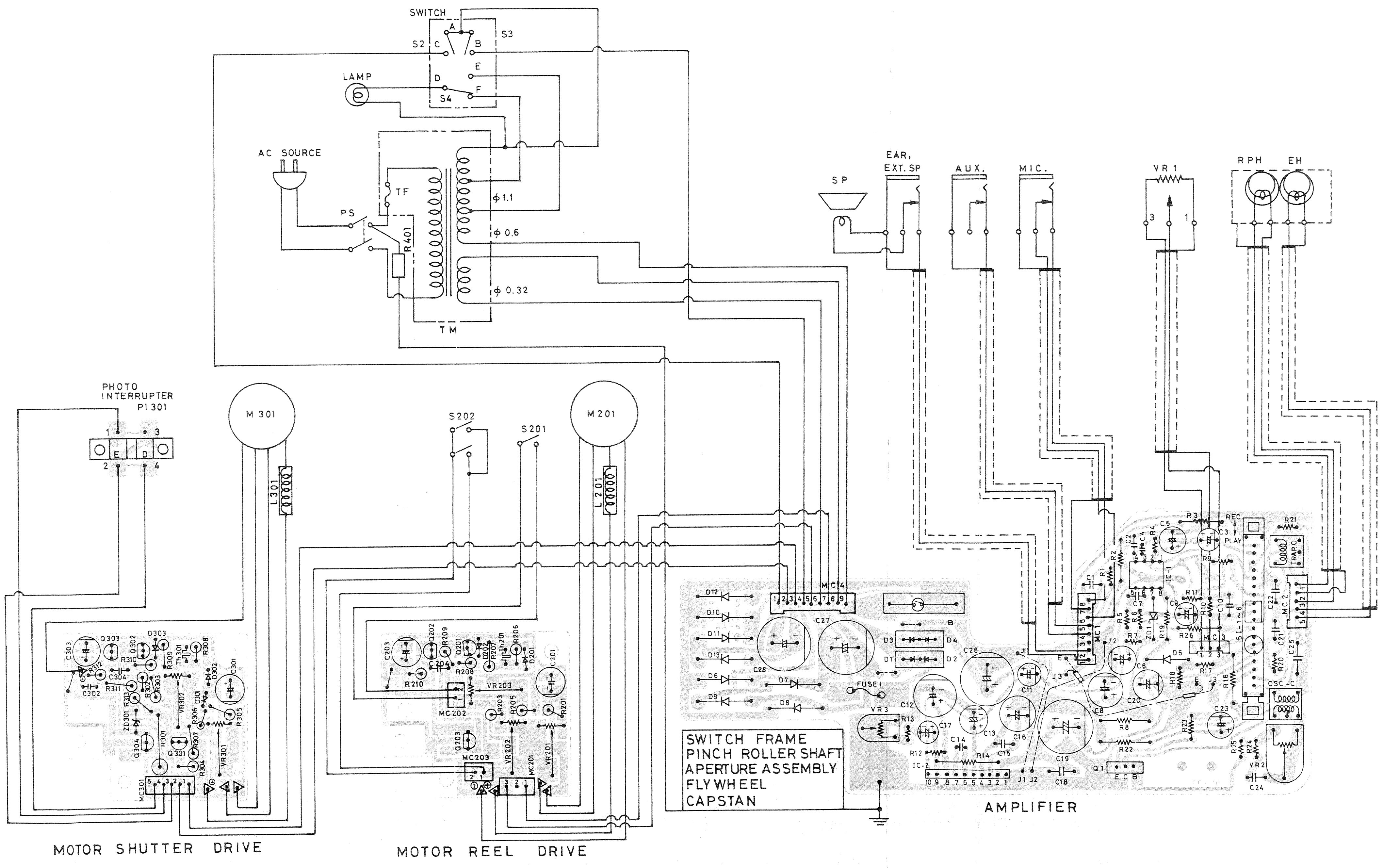
Terminal Identification


Transistor
Q1 2SD330
D330
B C E
Q203
Q304
2SD476
D476
B C E
IC
Q201
Q202
Q301
Q302
Q303
2SC945
B
C
E
IC-2
LA4220T
LA4220T
1 2 3 4 5 6 7 8 9 10
IC-1
LA3201
1 2 3 4
8 7 6 5
Bottom view

SCHEMATIC DIAGRAM


AUX
MIC
MC1
R2
R3
R1
C1
C2
C3
S1-1
S1-2
C6
R5
R6
R7
C7
IC1
R4
C4
C5
C20
R19
D5
ZD1
C8
C9
R9
R10
C10
R11
R18
R17
S1-3
VR1
MC3
S1-4
R26
R8
C13
C14
C15
C16
IC2
R12
C11
R14
C17
C19
C12
R13
C18
VR3
TRAP.C
R20
C22
C21
R21
RPH
EH
MC2
OSC.C
Q1
C25
R23
VR2
R24
R25
C24
C23
S1-6
R16
R22
C26
FUSE1
D2
D1
D4
D3
D6
D7
D8
D9
C27
D10
D11
D12
D13
C28
S1-5
J3
E
MC1
EAR
EXT.SP
SP
B
MC4
Ⓒ
Ⓑ
Ⓘ
Ⓐ
Ⓓ
Ⓚ
Ⓗ
Ⓔ
Ⓙ
LAMP
APERTURE ASSEMBLY
Ⓗ
Ⓔ
MC301
R302
R303
R304
R301
R313
ZD301
D301
D302
Q301
R305
VR301
R306
VR302
R307
G
R308
Th301
C301
R309
D303
R310
R311
Q302
L301
C305
M 301
C304
C306
C302
R312
Q303
Q304
C303
MOTOR SHUTTER DRIVE
PI301
E
D
1
2
3
4
SWITCH
A
S2
S3
C
B
D
S4
F
E
T.M
ϕ1.1
ϕ0.6
ϕ0.32
TF
AC SOURCE
P.S
R401
Ⓙ
Ⓚ
Ⓒ
Ⓑ
Ⓐ
SWITCH FRAME
FLYWHEEL
CAPSTAN
PINCH ROLLER SHAFT
Ⓓ
Ⓘ
MC 201
S202
MC203
S201
MC202
D201
VR202
R203
VR203
R205
VR201
R201
G
R206
Th201
C201
R207
D202
R208
R209
Q201
L201
C205
M 201
C204
C206
R210
Q202
Q203
C203
MOTOR REEL DRIVE
S1-1-1-6
1-6 1-5 1-4 1-3 1-2 1-1
REC
PLAY

WIRING DIAGRAM


SWITCH
S2
S3
S4
A
B
C
D
E
F
LAMP
AC SOURCE
PS
TF
R401
ϕ 1.1
ϕ 0.6
ϕ 0.32
TM
SP
EAR,
EXT. SP
AUX.
MIC.
VR 1
RPH
EH
PHOTO
INTERRUPTER
PI 301
M 301
L301
S202
S201
M 201
L 201
MC4
SWITCH FRAME
PINCH ROLLER SHAFT
APERTURE ASSEMBLY
FLYWHEEL
CAPSTAN
FUSE1
VR3
IC-1
MC1
MC2
Q1
REC
PLAY
OSC-C
MC301
MC201
MC202
MC203
VR201
VR202
VR203
VR301
VR302
AMPLIFIER
MOTOR SHUTTER DRIVE
MOTOR REEL DRIVE

* All values measured with a digital voltmeter having a 1M ohm internal impedance.

VOLTAGE CHART FOR MAIN CIRCUIT (633-0-3110-00100)

Measurement points		Voltage at STOP mode	Voltage at PLAY mode with 1.5W audio output
IC-1 Pin No.	2	0.59 VDC	0.59 VDC
	3	0.016 VDC	0.016 VDC
	4	0.59 VDC	0.59 VDC
	5	1.2 VDC	1.2 VDC
	6	3.2 VDC	3.1 VDC
	7	Common ground for measurement	
IC-2 Pin No.	1	Common ground for measurement	
	2	8.7 VDC	7.2 VDC
	3	17 VDC	14 VDC
	4	15 VDC	13 VDC
	5	13 VDC	11 VDC
	6	10 VDC	8.7 VDC
	7	1.5 VDC	1.5 VDC
	8	8.7 VDC	7.4 VDC
	9	8.4 VDC	7.0 VDC
	10	8.2 VDC	6.9 VDC
C8 + - —		4.7 VDC	4.6 VDC
C6 + - —		4.6 VDC	4.5 VDC
MC4 5-6		13.4 VAC	12.5 V

Measurement points			Voltage at REC mode	Voltage at REC + PLAY mode
C23 + - —			14 VDC	13 VDC
C23 —	Q1	C	14 VDC	13 VDC
		B	1.2 VDC	1.1 VDC
		E	0.88 VDC	0.82 VDC

Measurement points	Voltage at STOP mode	Voltage at PLAY mode
MC4 Pin No. 1-7	24 VAC	21 VAC

VOLTAGE CHART FOR SHUTTER DRIVE MOTOR CIRCUIT

Measurement points (MC 301 Pin No.1)		Voltage at PLAY mode (with film not loaded)	
		Loop Senser at released position	Loop Senser at pushed down position
MC 301	Pin No.2	26 VDC	26 VDC
	Pin No.4	1.1 VDC	1.1 VDC
	Pin No.5	6.6VDC	0.6 VDC
Q301	B	0.67 VDC	0.13 VDC
	C	0.05 VDC	0.18 VDC
(G)		2.7 VAC	1.8 VAC
Q302	B	0.61 VDC	0.65 VDC
	C	0.8 VDC	0.6 VDC
Q303 Q304	C	11 VDC	17 VDC

VOLTAGES FOR LAMP

Measurement points	Voltage at STOP mode	Voltage at PLAY mode
Lamp terminal	1.3 VAC	8.0 V

VOLTAGE CHART FOR REEL DRIVE MOTOR CIRCUIT

Measurement points (MC201 Pin No. 1)		Voltage at PLAY mode (with film not loaded)			Voltage at REW mode (with film not loaded)
		Regular (S201 ON)	Single 18 frames (S201 OFF, S202 ON)	Single 24 frames (S201 OFF, S202 OFF)	Single 24 frames
(G)		1.3 VAC	1.4 VAC	1.6 VAC	
Q201	B	0.65 VDC	0.65 VDC	0.65 VDC	
	C	0.30 VDC	0.31 VDC	0.35 VDC	
Q202,203	C	18 VDC	17 VDC	14 VDC	18 VDC
MC201 Pin No. 3		26 VDC	26 VDC	26 VDC	30 VDC

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